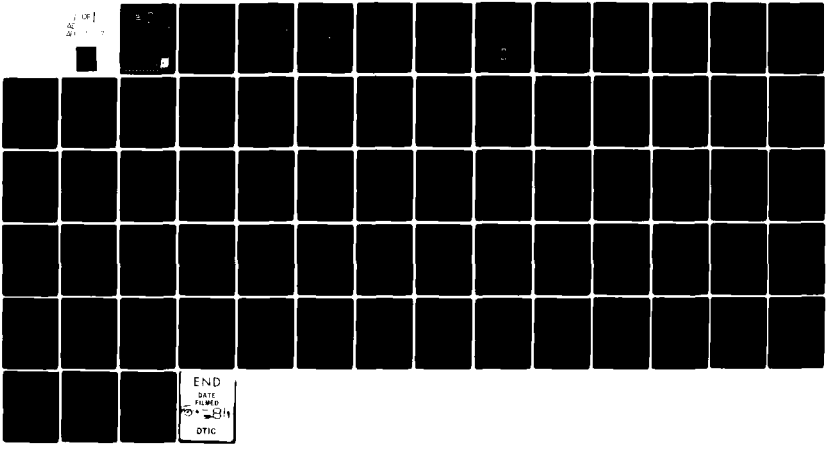
AD-A097 687 INSTITUTE FOR DEFENSE ANALYSES ARLINGTON VA INTERNAT--ETC F/G 13/10
COMPARISON OF U.S. AND USSR GENERAL PURPOSE NAVAL FLEETS, BRIEF--ETC(U)
FEB 81 J H HENRY, N B DAVIS, M M MATHEWS MDA903-79-C-0018
UNCLASSIFIED IDA-P-1529 IDA/HQ-80-22891 NL



END
DATE FILMED
5-81
DTIC

AD A097 687

Copy 337 of 352 copies
AD-E500 289

IDA PAPER P-1529

COMPARISON OF U.S. AND USSR GENERAL PURPOSE NAVAL FLEETS

Briefing Summary

James H. Henry

February 1981

Prepared for

Assistant to the Secretary of Defense
(Atomic Energy)

DTIC FILE COPY

LEVEL III

DTIC
ELECTE
APR 10 1981
S D
B

DISTRIBUTION STATEMENT A
Approved for public release;
Distribution Unlimited

INSTITUTE FOR DEFENSE ANALYSES
INTERNATIONAL SECURITY ASSESSMENT DIVISION

81 4 2 007

IDA Log No. HQ 80-22891

The work reported in this document was conducted under Contract MDA 903 79 C 0018 for the Department of Defense. The publication of this IDA Paper does not indicate endorsement by the Department of Defense, nor should the contents be construed as reflecting the official position of that agency.

Approved for public release; distribution unlimited.

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE	READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER	2. GOVT ACCESSION NO. AD-A097 687	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) COMPARISON OF U.S. AND U.S.S.R. GENERAL PURPOSE NAVAL FLEETS	5. TYPE OF REPORT & PERIOD COVERED Final
	6. PERFORMING ORG. REPORT NUMBER IDA Paper P-1529
7. AUTHOR(s) James H. Henry, Norman B. Davis, Margaret M. Mathews, J. Trevor McIntyre, Margaret S. Spencer	8. CONTRACT OR GRANT NUMBER(s) MDA 903 79 C 0018 NEW
9. PERFORMING ORGANIZATION NAME AND ADDRESS Institute for Defense Analyses International Security Assessment Division 400 Army-Navy Drive, Arlington, VA 22202	10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS T-O-073
11. CONTROLLING OFFICE NAME AND ADDRESS Assistant to the Secretary of Defense (Atomic Energy), Department of Defense, Washington, D.C. 20301	12. REPORT DATE February 1981
	13. NUMBER OF PAGES 65
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office) Office of the Under Secretary of Defense R&E DOD-IDA Management Office 400 Army-Navy Drive Arlington, VA 22202	15. SECURITY CLASS. (of this report) UNCLASSIFIED
	15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT (of this Report)

Approved for public release, distribution unlimited

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

18. SUPPLEMENTARY NOTES

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

Shipbuilding, Naval production, Aircraft carriers, Attack submarines, Cruisers, Destroyers, Frigates, Amphibious, Mine Warfare, Force level, General purpose fleet, Aggregates, Force level tonnage, Procurement costs, Shipbuilding outlays, Average age, Construction tonnage, Comparisons, Navy

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

U.S. and Soviet fleets are compared from 1965 to 1985 in terms of force size and force displacement tonnage, production rates and tonnage, average age, and estimated dollar procurement outlays. Additionally, comparisons are made for the categories of attack submarines; aircraft carriers; cruisers, destroyers, and frigates; amphibious craft; mine warfare ships; auxiliary ships.

DD FORM 1 JAN 73 1473 EDITION OF 1 NOV 65 IS OBSOLETE

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

71152

IDA PAPER P-1529

COMPARISON OF U.S. AND USSR GENERAL PURPOSE NAVAL FLEETS

Briefing Summary

James H. Henry
Norman B. Davis
Margaret M. Mathews
J. Trevor McIntyre
Margaret S. Spencer

February 1981

INSTITUTE FOR DEFENSE ANALYSES
INTERNATIONAL SECURITY ASSESSMENT DIVISION
400 Army-Navy Drive, Arlington, Virginia 22202

Contract MDA 903 79 C 0018
Task 0-073

FOREWORD

For some years IDA has been engaged in developing measures of trends of U.S. and U.S.S.R. military investment. Initially the task was to compare weapon system development programs in terms of R&D effort. Subsequently the scope was expanded to include acquisition expenditures. Earlier reports compared U.S./U.S.S.R. RDT&E levels of effort.* More recently, comparisons were presented of strategic offensive resources commitments.** This report, on general purpose naval forces, is a part of this comparative study program.

Such studies have a number of purposes. Estimating the level of effort assigned to each major program category is one objective. Determination of the distribution of the effort among the elements of each category is also sought. To know the comparative relationships between RDT&E and force deployment is also desirable. Another purpose is to appraise the effects of quantity and quality of weapons systems in determination of force balance. Obviously these goals are very difficult to accomplish. New estimates are needed as new information or understanding is developed.

Much of the presentation included in this paper was built on work completed by Norman Asher, Pythagoras Cutchis, and James Boisseau, all of IDA. Without their accomplished groundwork this paper would not have been possible.

---

*e.g., "Comparison of U.S. and Soviet Military RDT&E and Space Programs," 1978 Edition, IDA Paper P-1367, J. J. DeLang and L. P. Minichiello, January 1979 (SECRET).

**e.g., "Comparison of U.S. and USSR Strategic Offensive Forces: Indicators of RDT&E and Procurement Resource Commitment and Force Effectiveness," IDA Paper P-1369, L. P. Minichiello et al., November 1978 (TOP SECRET).

SUMMARY

This paper presents comparisons of trends of the U.S. and U.S.S.R. general purpose naval fleets for the period 1965 to 1985. The aggregated measures compared are: force level, fleet displacement tonnage, ship construction rate and construction displacement, estimated acquisition costs, and average age.

Not included in this study are strategic systems (e.g., SSBN), carrier aircraft, and patrol ships. The combat effectiveness of the two fleets is also not examined.

The methodology tries to emphasize comparability. For example, the same cost estimating relationships (CERs) are used for both the Soviet and U.S. procurement outlays rather than actual expenditures.

The CERs used for each category of ship are from a set of relationships linear with displacement, developed from data on the costs of constructing U.S. ships in U.S. shipyards. This method yields satisfactory estimates of aggregations of U.S. naval ships and it is assumed to apply to similar aggregations for Soviet naval ships.

The composition and characteristics of the U.S. Fleet were developed from a detailed, hull-number accounting for each year. Data for the U.S.S.R. fleet were derived from official intelligence sources.

The trends are shown for the following categories of ships:

Attack Submarines
Aircraft Carriers
Cruisers, Destroyers and Frigates
Amphibious Warfare Ships
Mine Warfare Ships
Auxiliary Forces

Overall it is seen that the Soviets have expanded their naval forces in every category (except Amphibious) since the early 1970s while U.S. force levels have generally remained constant or declined. The Soviets have doubled the number of their nuclear attack submarines while continuing to build diesel submarines. The U.S. has also increased its force of nuclear attack submarines but has built no diesel submarines. Soviet outlays for general purpose naval ships have increased about six percent per year in the last ten years (a total of 60 percent), whereas U.S. outlays have remained virtually unchanged.

DTIC
ELECTE
APR 1 0 1981
S D
B

RE: IDA Paper P-1529, Classified References, Distribution Unlimited-
No change per Dr. Paul J. Berenson,
OASD/Atomic Energy

Accession For
NTIS GRA&I ☑
DTIC TAB ☐
Unannounced ☐
Justification
By
Distribution/
Availability Codes
Dist | Avail and/or Special
A

CONTENTS

Foreword iii

Summary v

Introduction 1

General Purpose Fleets - U.S./U.S.S.R. Comparisons 9

- Force Levels and Tonnages 10
- Comparisons by Category of Ship Classes 13
  - Attack Submarines 14
  - Aircraft Carriers 20
  - Cruisers, Destroyers, and Frigates 24
  - Amphibious Warfare Ships 28
  - Mine Warfare Ships 32
  - Auxiliary Forces 36
- Investment and Age, Shipbuilding 40
- Total Procurement Outlays Compared 44
- Production Compared 46
- The IDA Procurement Outlay Model, Comparison With Other Models 48

A Research and Development Cost Estimating Attempt and Comparison 51

References 55

Appendix A--U.S. and U.S.S.R. Force Levels, Tonnage, and Procurement Cost A-1

FIGURES

1. Spread of Ship Procurement Costs 3
2. Cost Estimating Relationships for All Categories 5
3. General Purpose Fleets, U.S. Force Levels 11
4. General Purpose Fleets, U.S.S.R. Force Levels 11

FIGURES (cont'd)

5.	General Purpose Fleets, U.S. Tonnages	12
6.	General Purpose Fleets, U.S.S.R. Tonnages	12
7.	Attack Submarines, Force Levels, U.S./U.S.S.R.	15
8.	Attack Submarines, Tonnages, U.S./U.S.S.R.	15
9.	Attack Submarines by Average Ages, SSN, U.S./U.S.S.R.	17
10.	Attack Submarines by Average Ages, SS, U.S./U.S.S.R.	17
11.	Attack Submarines by Average Ages, SSN plus SS, U.S./U.S.S.R.	17
12.	Attack Submarines, Procurement Outlays	19
13.	Attack Submarines, Submarine Production	19
14.	Attack Submarines, Tonnage Production	19
15.	Aircraft Carriers, Force Levels	21
16.	Aircraft Carriers, Tonnages	21
17.	Aircraft Carriers, Average Ages	21
18.	Aircraft Carriers, Procurement Outlays	23
19.	Aircraft Carriers, Ship Production	23
21.	Cruisers, Destroyers, and Frigates, Force Levels	25
22.	Cruisers, Destroyers, and Frigates, Tonnages	25
23.	Cruisers, Destroyers, and Frigates, Average Ages	25
24.	Cruisers, Destroyers, and Frigates, Procurement Outlays	27
25.	Cruisers, Destroyers, and Frigates, Ship Production	27
26.	Cruisers, Destroyers, and Frigates, Tonnage Production	27
27.	Amphibious Warfare Ships, Force Levels	29
28.	Amphibious Warfare Ships, Tonnages	29
29.	Amphibious Warfare Ships, Average Ages	29
30.	Amphibious Warfare Ships, Procurement Outlays	31
31.	Amphibious Warfare Ships, Ship Production	31
32.	Amphibious Warfare Ships, Tonnage Production	31
33.	Mine Warfare Ships, Force Levels	33
34.	Mine Warfare Ships, Average Ages	33
35.	Mine Warfare Ships, Tonnages	33
36.	Mine Warfare Ships, Procurement Outlays	35
37.	Mine Warfare Ships, Ship Production	35
38.	Mine Warfare Ships, Tonnage Production	35
39.	Auxiliary Forces, Force Levels	37
40.	Auxiliary Forces, Tonnages	37
41.	Auxiliary Forces, Average Ages	37
42.	Auxiliary Forces, Procurement Outlays	39
43.	Auxiliary Forces, Ship Production	39
44.	Auxiliary Forces, Tonnage Production	39

FIGURES (cont'd)

45. General Purpose Fleets (less Auxiliary Vessels), Average Age 41
46. General Purpose Fleets (less Auxiliary Vessels), Procurement Outlays 41
47. General Purpose Fleets (less Auxiliary Vessels), Ship Production 43
48. General Purpose Fleets (less Auxiliary Vessels), Tonnage Production 43
49. General Purpose Fleets (less Auxiliary Vessels), Procurement Outlays, U.S. 45
50. General Purpose Fleets (less Auxiliary Vessels), Procurement Outlays, U.S.S.R. 45
51. General Purpose Fleets (less Auxiliary Vessels), Procurement Outlays, Totals 45
52. General Purpose Fleets, Ship Production 47
53. General Purpose Fleets, Tonnage Production 47
54. Procurement Outlays--Comparisons With Other Models (U.S.S.R.) 49
55. Procurement Outlays--Comparisons With Other Models (U.S.) 49
56. U.S. Ship-Related R&D Appropriations 53
57. U.S. R&D Appropriations 53
58. U.S. Ship-Related R&D and SCN Outlays 54
59. Ship Related R&D Outlays, U.S. and U.S.S.R. 54

TABLES

1. Ship Cost Estimating Relationships 6

A-1 U.S. and Soviet Fleet Force Levels A-2
A-2 U.S. and Soviet General Purpose Ships, Tonnages A-4
A-3 Procurement Costs for General Purpose Ships A-6

INTRODUCTION

In this summary type presentation are comparisons of U.S. and U.S.S.R. force levels, tonnages, estimated procurement cost outlays, average ages, and rates and tons of annual production of general purpose naval ships from 1965 to 1985. Naval aircraft are not included in these comparisons nor are strategic missile carrying submarines. No attempt is made to compare the effectiveness of the forces.

The categories of ships in the fleets and included in these comparisons are:

- Attack submarines--SS, SSN, SSG, SSGN
- Aircraft carriers--CV, CVN, CVHG, CVS
- Cruisers/Destroyers/Frigates--CG, CGN, CLG, CA, CHG, CBGN--DD, DDG--FF, FFG, FFL
- Amphibious warfare ships--LHA, LCC, LPH, LPD, LKA, LSD, LST, LPA, LSM, LCU, LCPA, LCUA, LCMA
- Mine warfare ships--MSC, MSO, MCM, MSF, MCS, MSS, MSI
- Auxiliary ships--AR, AE, AFS, AOE, AOR, AO, ASR, ATF, ATS, AG, AS, AD, ARS, AEM, AGP, AGI

Not included are patrol craft which with a few exceptions are unique to the Soviet Navy.

Emphasis is placed on comparability. The procurement cost outlays are estimated for both the U.S. and the U.S.S.R. ships by using the same cost estimating relationships (CER's), based on displacement according to vessel category. The CER's are applied to new ship construction and major conversions in the 1965-1985 interval. The CER's are derived from the costs for building U.S. ships in U.S. shipyards.

It must be stressed that such cost estimates measured in dollars for the Soviet Union cannot be expected to represent the actual investment burden to the Soviet Union. The trends of the procurement costs over time have greater significance. Where it might not be valid to say that the Soviet Union spent X percent more than the United States for a particular period, it is meaningful and indicative to say that the Soviet Union is

increasing its spending rate by X percent per year during the period. The costs shown throughout as U.S.S.R. outlays are derived as estimates of costs that would be incurred by the United States for construction in the United States of U.S. equivalent vessels. All costs attributed to the Soviet Union must be regarded as estimates of equivalent U.S. outlays.

Ship procurement costs include new ship construction and major modification costs--that is, costs analogous to those funded by the U.S. SCN appropriations--but spread to reflect outlays over the years of normal budget, planning and construction schedules. Average ages of vessels are calculated according to the dates each vessel is introduced into and removed from the fleet. Vessels undergoing major conversions are considered as being new when they are reintroduced into the fleet, even though the original hull has aged according to its initial commissioning date.

In addition to ships already commissioned, the data base for the calculation of annual expenditures includes projections for additions to both fleets through 1988. The tables and figures include planned procurement outlays projected to be expended through 1985 for vessels scheduled for commissioning between 1985 and 1988. These outlays, being subject to change, are shown under hachure. Obviously they represent expectations of future production, not actual expenditures. The model spreads the procurement outlays uniformly so that the expenditures begin 6 years prior to, and end 2 years after, the delivery year. A delivery expected beyond 1988 will not have its outlays shown, although they would otherwise be shown as beginning in 1983, 84 or 85. Thus expenditures for years after 1982 tail off, reflecting this omission. Figure 1 presents examples of actual outlay schedules and the approximation used to spread costs (shaded areas) for two representative vessels.

The force level and displacement data for the U.S. fleet are taken from IDA Paper P-1520 (Ref. 1), which shows all changes to the active fleet from 1961 through 1985 on an individual ship hull-number basis. Additional auxiliary support ships that are not assigned to the active fleet, but are listed as part of the supporting fleet, are included in an attempt to keep the U.S.-U.S.S.R. comparisons on a parallel basis. Projections for the U.S.S.R. fleet were based on current published reports.

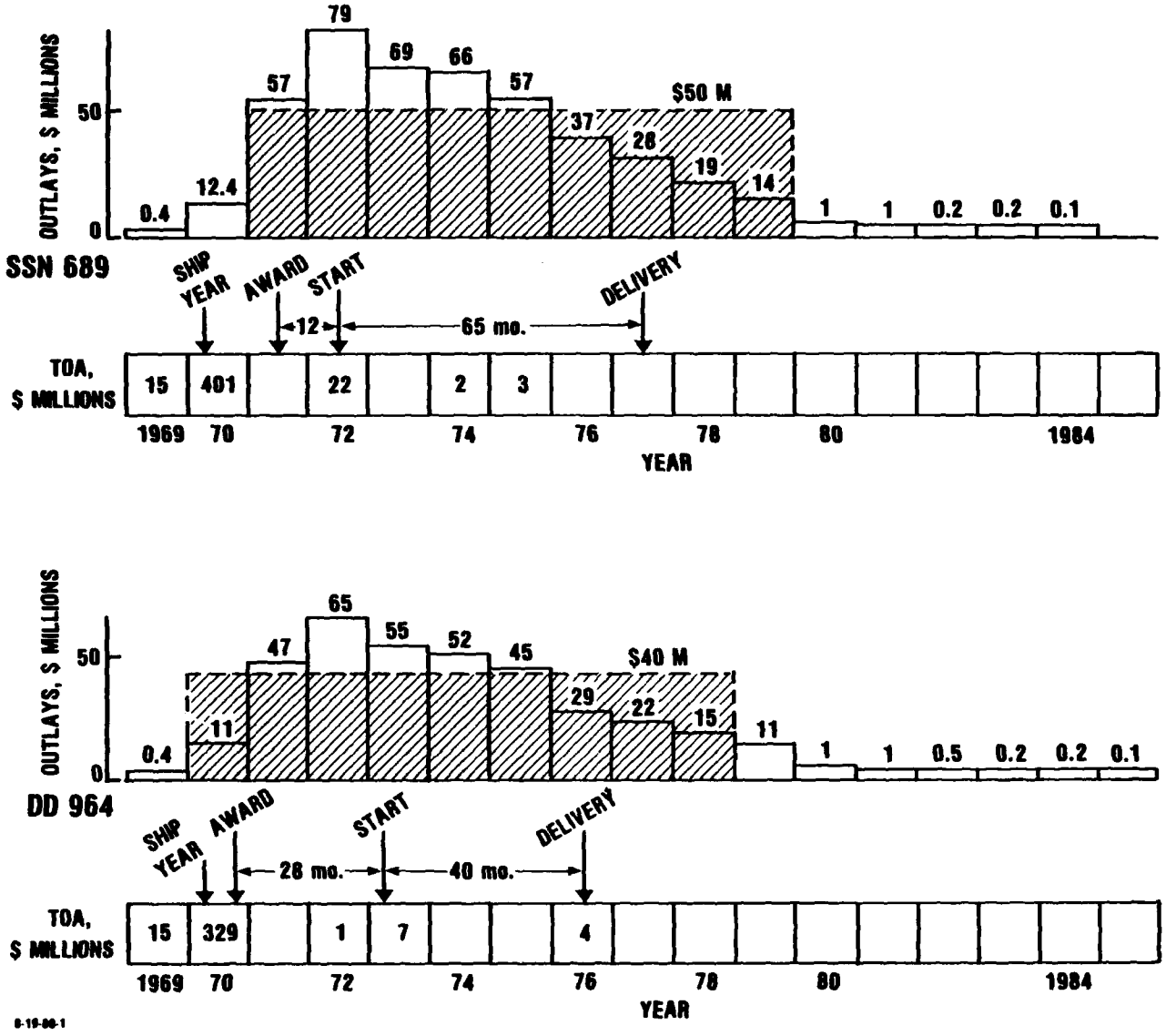


FIGURE 1. ACTUAL AND APPROXIMATION TO SPREAD OF SHIP PROCUREMENT OUTLAYS

The cost estimating relationships are developed in IDA Paper P-1530 (Ref. 2). Figure 2 and Table 1, taken directly from IDA Paper P-1530, present the cost estimating relationships for all categories of vessels in the general purpose fleet.

The next four figures present cumulative comparisons of the U.S. and the U.S.S.R. fleets, accumulated from attack submarines through mine warfare vessels, and including the auxiliary support vessels. Comparisons of the individual categories are then presented on the pages following throughout the paper.

Plotted figures showing information through 1985 have the entries shaded between 1982 and 1985, indicating the change from reported values to estimated future values.

Tables presenting the U.S. and U.S.S.R. force levels, fleet tonnages, and estimated procurement costs are in Appendix A.

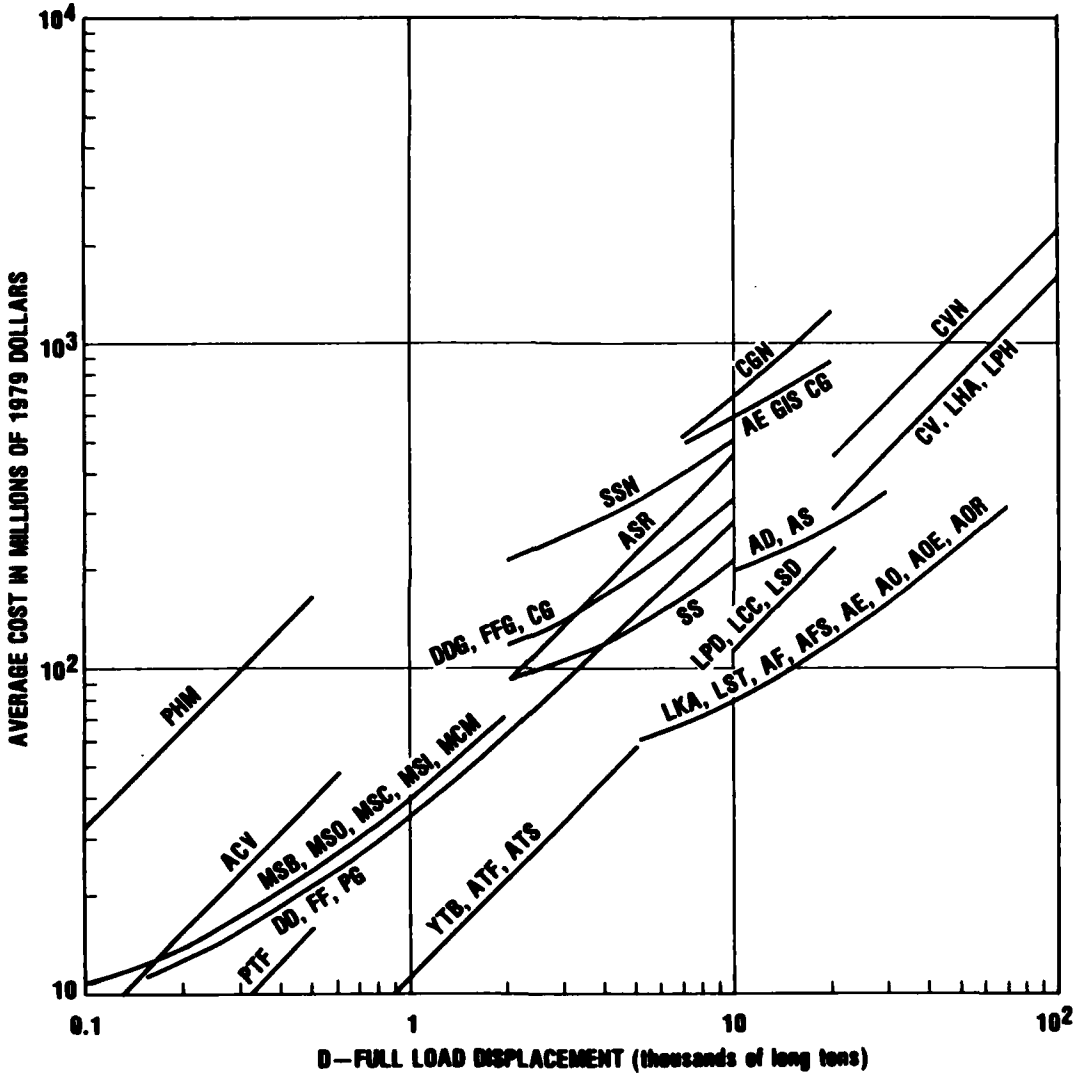


FIGURE 2. COST ESTIMATING RELATIONSHIPS FOR ALL CATEGORIES

TABLE 1. SHIP COST ESTIMATING RELATIONSHIPS

CLASS	LEAD SHIP HULL NO.	TOTAL NO. OF SHIPS COSTED	IOC	LEAD SHIP COST 79$M	AVERAGE FOLLOW-ON SHIP COST 79$M	FULL LOAD DISPLACE-MENT-KLT	ESTIMATE 79$M	% DIFF.	CER
AIRCRAFT AND HELICOPTER CARRIERS									
CV	59	4	1955	-	1,114	79.65	1,219	8.6	
	63	3	1961	-	1,299	80.3	1,229	-5.7	C = 15.3D
	67	1	1968	-	1,286	80.8	1,236	-4.0	
LHA	1	4	1976	-	577.9	39.3	601.4	3.9	
LPH	2	7	1961	-	229.6	18.9	289.21	20.6	
CVN	65	1	1961	-	2,239	91.0	2,017	-11.0	C = 22.2D
	68	2	1975	-	1,878	94.4	2,092	10.2	
ATTACK SUBMARINES									
SSN	578	4	1957	361.9	216.2	2.86	247.4	12.6	
	585	6	1959	358.3	255.9	3.50	270.0	5.2	
	594	13	1961	395.3	387.8	4.45	303.6	-27.7	C'= 146 + 35.4D
	637	*37*	*1967*	*329.8*	*294.1*	*4.582*	*308.3*	*4.6*	
	688	13	1976	603.7	366.6	6.927	391.3	6.3	
SS	580	3	1959	170.6	100.6	2.639	100.6	-	C = 61.3 + 14.9D
DESTROYERS, FRIGATES AND PATROL ESCORTS									
DD	931	18	1954	211.5	135.7	3.950	115.8	-17.2	
FF	1021	10	1957	51.2	52.5	1.914	59.9	12.4	
	1033	4	1959	52.7	49.7	1.750	55.3	10.1	C = 7.2 + 27.5D
	1040	10	1964	121.0	108.2	3.344	99.2	-9.1	
	1052	10	1969	252.5	108.9	4.100	120.0	9.2	
DD	963	30	1975	340.1	221.3	7.964	226.3	2.2	
PG	84	10	1966	-	14.5	.26	14.4	-0.7	
GUIDED MISSILE EQUIPPED CRUISERS, DESTROYERS AND FRIGATES									
CG	16	9	1962	410.6	278.9	8.074	276.0	-1.0	
	26	9	1964	330.8	265.4	8.5	287.2	7.6	
DDG	2	23	1960	257.0	178.2	4.5	182.0	2.1	C = 63.5 + 26.3D
DDG/DLG	37	10	1960	335.5	259.4	5.96	220.3	-17.7	
FFG	1	6	1966	138.1	125.6	3.4	153.0	17.9	
	7	7	1977	452.8	169.5	3.605	158.4	-7.0	
AEGIS CG	47	18	1983	1,014	555*	8.9	555	-	C = 310 + 27.5D

*Estimated

(Continued)

TABLE 1. (Continued)

CLASS	LEAD SHIP HULL NO.	TOTAL NO. OF SHIPS COSTED	IOC	LEAD SHIP COST 79$M	AVERAGE FOLLOW-ON SHIP COST 79$M	FULL LOAD DISPLACE-MENT-KLT	ESTIMATE 79$M	% DIFF.	CER
GUIDED MISSILE EQUIPPED, NUCLEAR POWERED CRUISERS									
CGN	9	1	1961	-	1,672	17.1	1,052	-58.9	
	25	1	1962	-	765.7	9.2	625.9	-22.2	
	35	1	1967	-	579.3	8.8	604.3	4.1	C = 130 + 53.9D
	36	2	1974	-	711.3	10.53	697.6	-2.0	
	38	4	1976	-	591.4	11.0	722.9	18.2	
MAJOR AMPHIBIOUS SHIPS									
LPD	1	3	1962	-	210.7	14.651	170.4	-23.6	
	4	9	1965	-	160.8	16.913	196.7	18.3	
LCC	19	2	1970	465.0	256.6	17.0	197.8	-29.7	C = 11.6D
LSD	28	8	1954	-	114.2	12.0	139.6	18.2	
	36	5	1969	-	114.5	14.0	162.9	29.7	
CARGO AND SUPPLY SHIPS									
LKA	113	5	1968	-	108.5	18.657	111.1	0.4	
LST	1171	7	1957	-	73.5	7.804	69.6	-11.2	
	1179	20	1969	-	83.1	8.4	71.9	-21.3	
AF	58	2	1955	-	95.2	10.68	80.6	1.4	
AFS	1	7	1963	-	104.4	15.54	101.2	-5.9	
AE	21	5	1951	-	88.0	17.45	106.5	15.5	C = 39.7 + 3.83D
	26	8	1968	-	130.0	19.937	116.0	-14.1	
AO	177	2	1979	-	157.5	27.5	145.0	-9.6	
T-AO	143	6	1953	-	128.3	38.0	185.2	30.6	
AOE	1	4	1963	-	313.4	52.483	240.6	-29.6	
AOR	1	7	1968	-	143.7	41.35	198.0	27.5	
MINE WARFARE SHIPS									
MSB	5	30	1952	-	5.6	.039	8.55	34.5	
MSO	427	36	1952	-	30.9	.87	34.8	11.2	
MSC	121	9	1953	-	32.7	.378	19.3	-69.4	C = 7.32 + 31.6D
MSI	1	2	1958	-	8.3	.24	14.9	44.3	
MCM	82	9	1985	-	50.7*	1.65	59.5	14.8	

*Estimated

(Continued)

TABLE 1. (Continued)

CLASS	LEAD SHIP HULL NO.	TOTAL NO. OF SHIPS COSTED	IOC	LEAD SHIP COST 79$M	AVERAGE FOLLOW-ON SHIP COST 79$M	FULL LOAD DISPLACE-MENT-KLT	ESTIMATE 79$M	% DIFF.	CER
DESTROYER AND SUBMARINE TENDERS									
AD	37	2	1967	-	240.0	18.54	260.6	7.9	
	41	1	1980	-	318.4	20.3	273.1	-16.6	C = 129 + 7.10D
AS	33	2	1964	-	265.1	21.0	278.1	4.7	
	36	5	1970	-	278.2	22.646	289.8	4.0	
TUGS AND SALVAGE VESSELS									
YTB	752	80	1959	-	2.429	.35	3.99	39.1	
ATF	166	6	1979	-	16.1	2.00	22.8	29.3	C = 11.4D
ATS	1	3	1971	-	40.796	3.2	36.5	-11.8	
SINGLE UNIT CLASS									
ASR	21	2	1973	-	204.2	4.53	204.2	-	C = 45D
PTF	17	10	1968	-	3.3	.105	3.3	-	C = 31.4D
PHM	1	6	1977	-	78.5*	.238	78.5	-	C = 330D
ACV	**	1	1970	-	4.2	.055	4.2	-	C = 76.6D

*Estimated

**UK-Wellington

GENERAL PURPOSE FLEETS -

U.S./U.S.S.R. COMPARISONS

FORCE LEVELS AND TONNAGES

The U.S.S.R. fleet has outnumbered the U.S. fleet since 1965 by more than two to one. In terms of displacement weight, the United States has larger, heavier warships, and its total tonnage, not counting the auxiliary ships, exceeds the U.S.S.R. fleet by fifty percent. The Soviets have maintained their fleet size and increased their total displacement steadily by two to three percent each year. Both comparisons through the 1970s reflect the historical U.S. oceanic force and the U.S.S.R. coastal warfare emphasis.

The Soviet Union did not include aircraft carriers in its fleet until 1976, yielding a clear advantage to the United States in that category. The United States has lagged behind the Soviet Union in numbers of other major surface combatants--cruisers, destroyers, and frigates, but is beginning to approach parity again.

In undersea warfare, the countries have similar numbers of nuclear attack submarines, but the Soviet Union includes diesel powered attack submarines for about half of its force, thus retaining an advantage in total numbers of attack submarines.

The United States relies on other vehicles and its allies for minelaying and sweeping, leaving the Soviet Union with superiority of both numbers and displacement of mine warfare ships.

Since the missions and capabilities of the ships classified as "auxiliary vessels" vary drastically and the vessels assigned by the two Navies for auxiliary support are not in many instances comparable, the figures of this paper that compare the fleets show the auxiliary vessels above the heavy line that includes the rest of the fleet. In some later comparisons, the fleets are compared specifically "less auxiliaries."

GENERAL PURPOSE FLEETS

FORCE LEVELS

U.S.

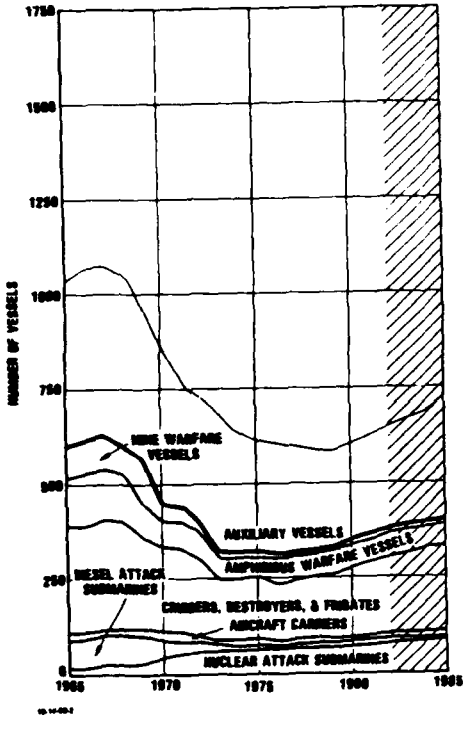


FIGURE 3

U.S.S.R.

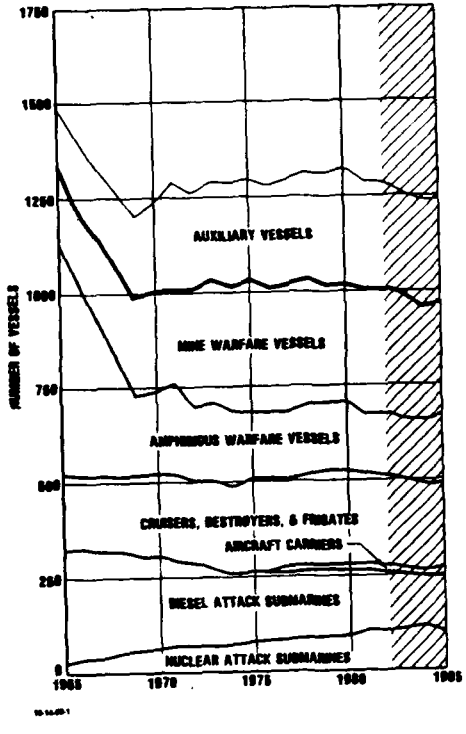


FIGURE 4

GENERAL PURPOSE FLEETS

TONNAGES

U.S.

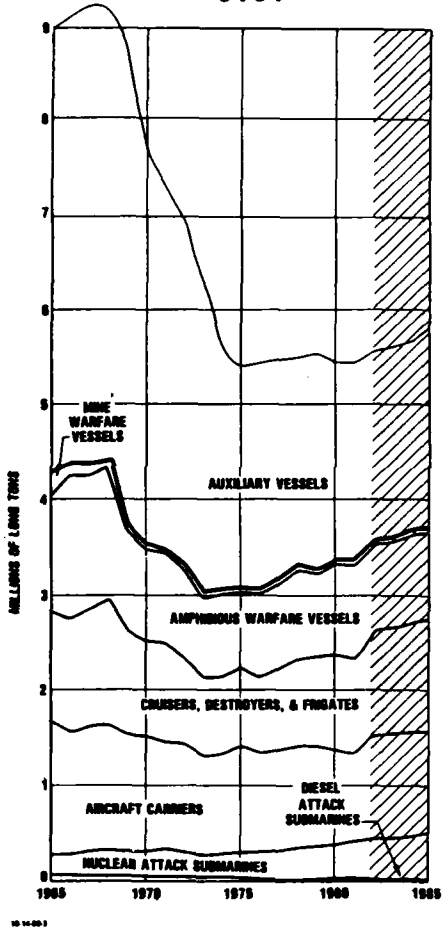


FIGURE 5

U.S.S.R.

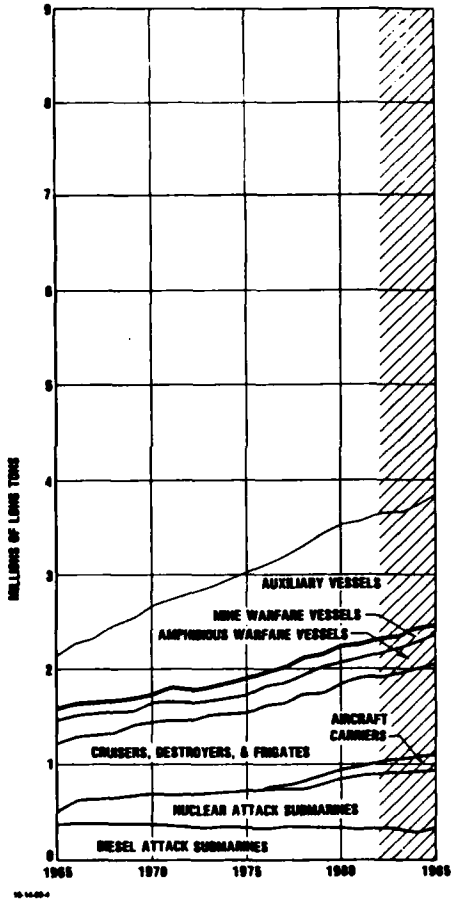


FIGURE 6

COMPARISONS BY CATEGORY OF SHIP CLASSES

- ATTACK SUBMARINES
- CARRIERS
- CRUISERS/DESTROYERS/FRIGATES
- AMPHIBIOUS VESSELS
- MINE WARFARE VESSELS
- AUXILIARY VESSELS

ATTACK SUBMARINES

- Soviet attack submarines, including SS, SSG, SSN, and SSGN categories, far outnumber U.S. submarines, as they have done since the end of World War II. The Soviet Union has always had 2-1/2 - 3 times more submarines afloat than has the United States and 2 times the tonnage, although both countries are increasing individual submarine displacement.

- The Soviets continue to maintain a fairly constant number of diesel attack submarines for their fleet, while the United States now relies almost completely on nuclear power, having discontinued production of diesel submarines in 1959.

ATTACK SUBMARINES

FORCE LEVELS

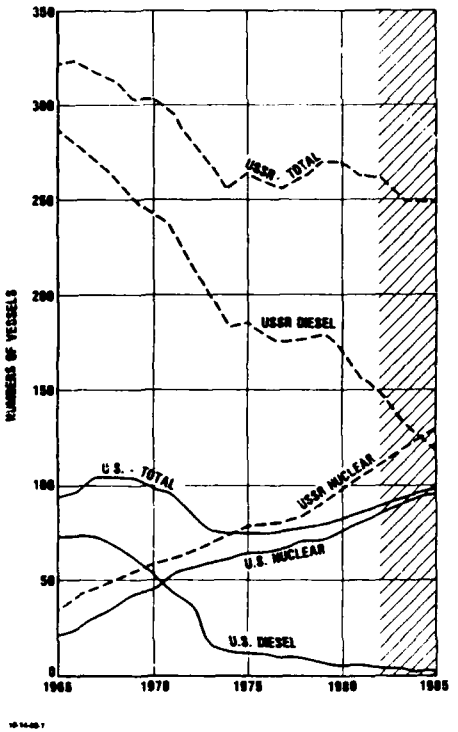


FIGURE 7

TONNAGES

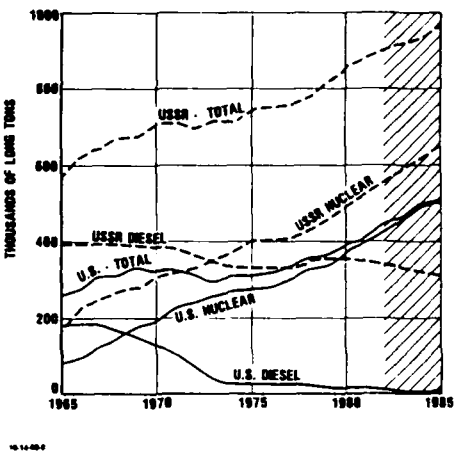


FIGURE 8

ATTACK SUBMARINES

- As far as nuclear powered attack submarines are concerned, the average ages of the two fleets have been almost identical but are expected to diverge, with the U.S. fleet becoming the older.

- The United States has not commissioned a diesel powered submarine since 1959. The average age of these submarines has remained relatively constant at 22-24 years by reason of retirement of older submarines.

ATTACK SUBMARINES

AVERAGE AGES

NUCLEAR POWERED (SSN)

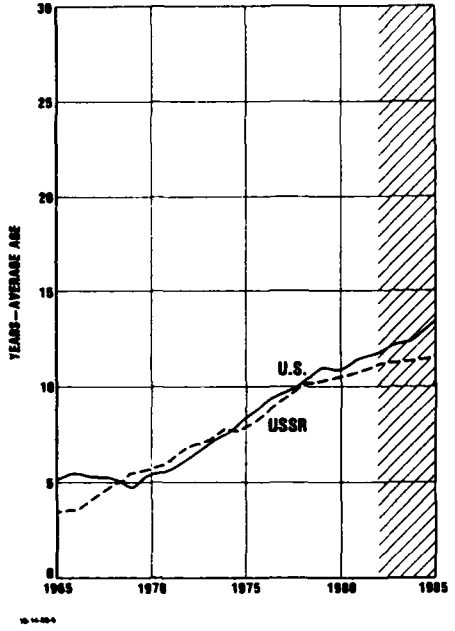


FIGURE 9

DIESEL POWERED (SS)

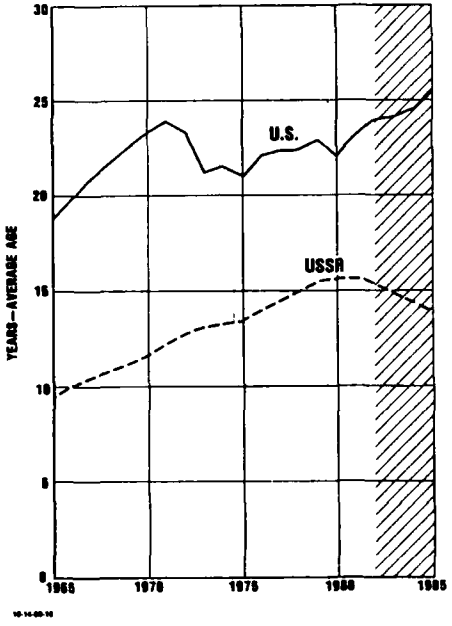


FIGURE 10

ALL ATTACK SUBMARINES (SSN + SS)

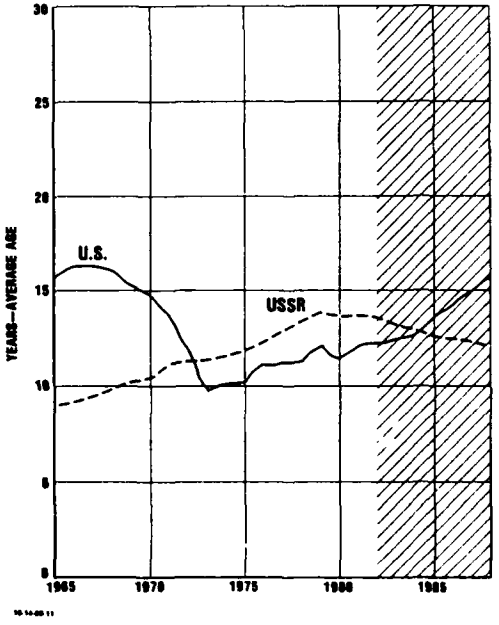


FIGURE 11

ATTACK SUBMARINES

- The procurement information shows that the Soviet Union is estimated to have maintained a relatively steady outlay for diesel submarines.

- Until 1972, the estimated Soviet extra investment in attack submarine procurement was adjudged spent on diesel submarines. Since 1972, U.S.S.R. procurement of nuclear attack submarines has risen dramatically and the latest outlays are drawing away from those of the United States at a significant rate.

- The United States and the Soviet Union are now producing nuclear attack submarines at about the same rate, but the Soviets still maintain their diesel submarine production in addition.

- The number of tons of nuclear attack submarines being produced by the two countries is also about even, with the U.S.S.R. diesel production again showing an addition.

ATTACK SUBMARINES

PROCUREMENT OUTLAYS

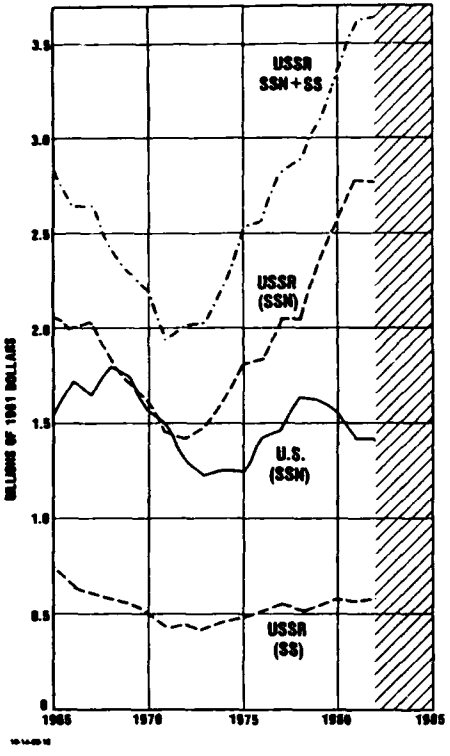


FIGURE 12

SUBMARINE PRODUCTION

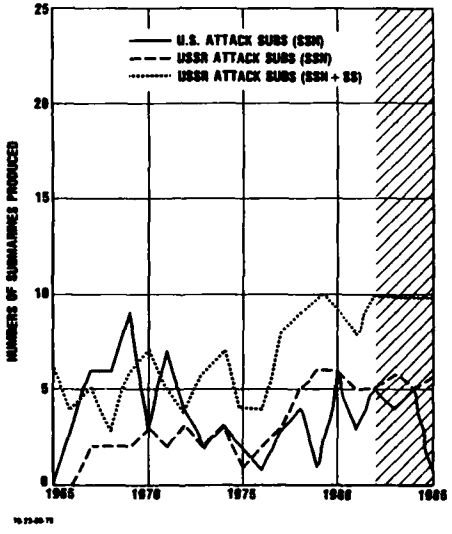


FIGURE 13

TONNAGE PRODUCTION

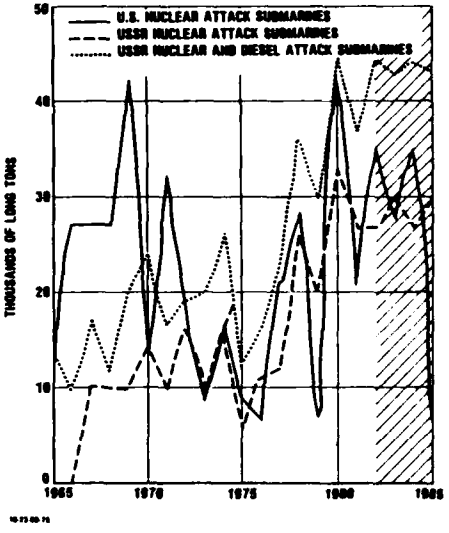


FIGURE 14

AIRCRAFT CARRIERS

- The U.S. superiority in both numbers of aircraft carriers and their displacement tonnages reflects the fact that the Soviet Union did not commission its first carrier until 1976, and is now slowly building up its capability.

- The U.S. overwhelming advantage in tonnage is brought about by the large size of its carriers--80-95,000 tons each--compared to the Soviet Union's fewer vessels at about 40,000 tons each.

- The nearly constant age of the U.S. carrier fleet results from the constant phasing-out of the older vessels as new ones are commissioned.

AIRCRAFT CARRIERS

FORCE LEVELS

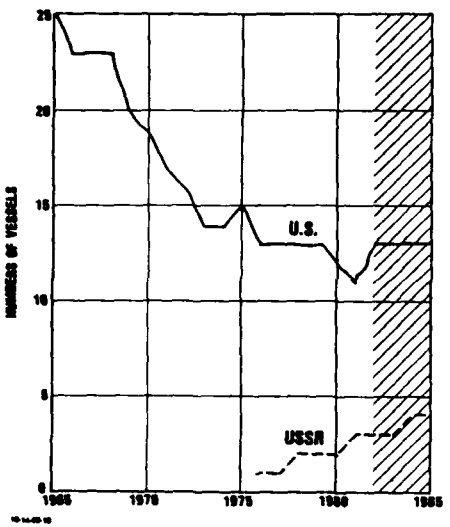


FIGURE 15

TONNAGES

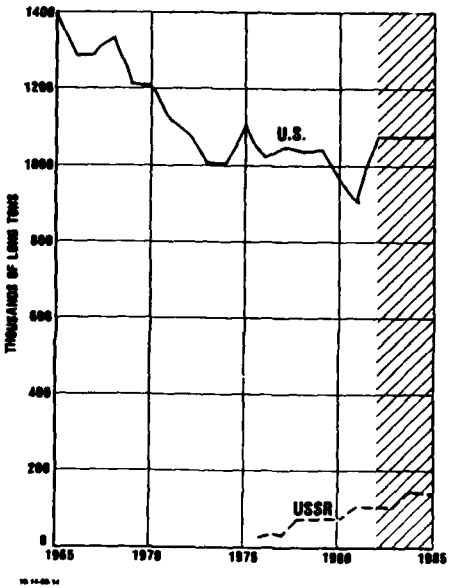


FIGURE 16

AVERAGE AGES

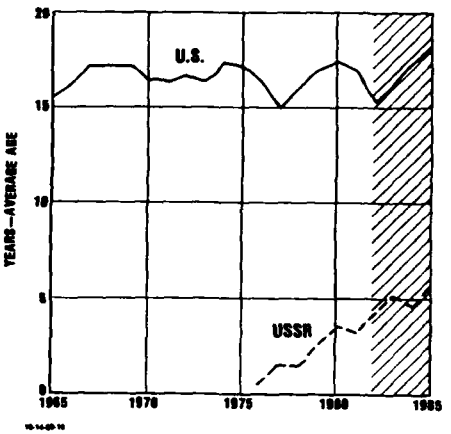


FIGURE 17

AIRCRAFT CARRIERS

- The significantly larger U.S. outlays for procurement are derived cost estimates, based on the weights of its carriers, coupled with the fact that all new acquisitions since 1968 are nuclear powered.

- The Soviet Union is beginning to construct carriers at about the same rate as the United States, but the average weight of their ships is less than half that of their U.S. counterparts, yielding a clear difference to the United States.

AIRCRAFT CARRIERS

PROCUREMENT OUTLAYS

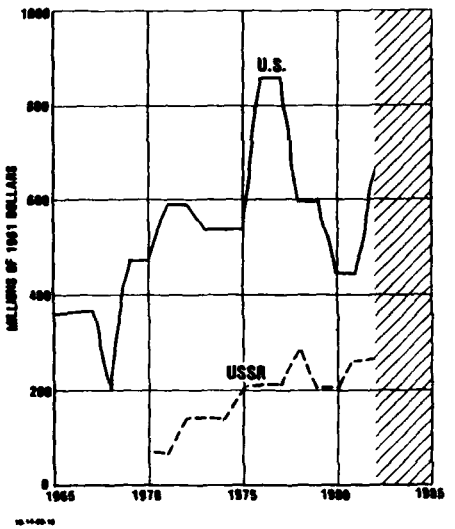


FIGURE 18

SHIP PRODUCTION

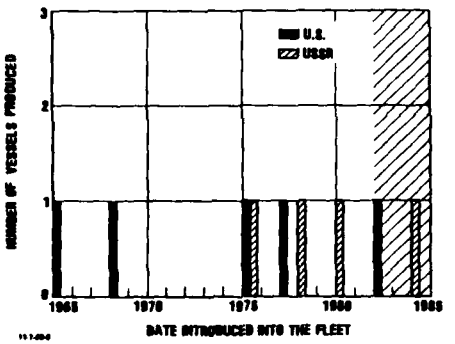


FIGURE 19

TONNAGE PRODUCTION

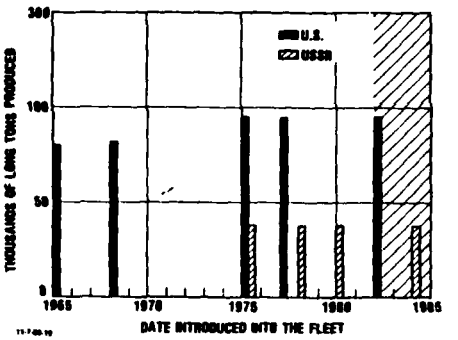


FIGURE 20

CRUISERS, DESTROYERS, AND FRIGATES

- Cruisers, destroyers, and frigates are grouped into a single category. Often when classes undergo major conversions the ships are also shifted within subcategory (e.g., between cruisers and destroyers), and it is then difficult to retain consistency. Also, the distinction among subcategories is not necessarily drawn along the same lines for U.S.S.R. and U.S. vessels.

- The sharp drop in force level of the U.S. fleet of cruisers, destroyers, and frigates in the early '70s was brought about by the retiring of numbers of WWII ships, although the United States is again approaching equality with the Soviet Union.

- The slight advantage in fleet tonnage with a smaller force level is occasioned by the U.S. choice of larger ships for their missions.

- Neither side appears to have any significant advantage in age of the cruiser/destroyer/frigate fleet.

CRUISERS, DESTROYERS, AND FRIGATES

FORCE LEVELS

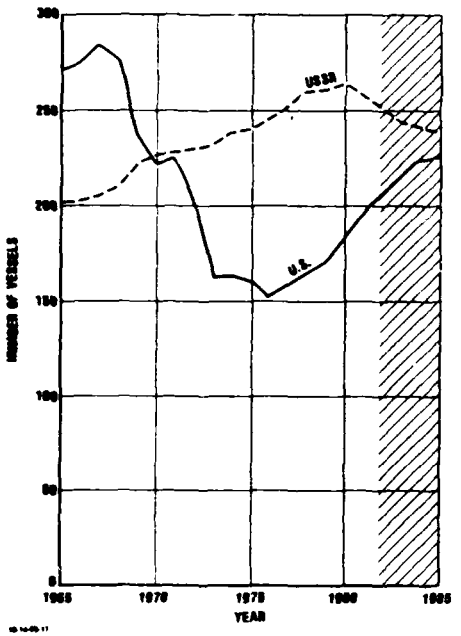


FIGURE 21

TONNAGES

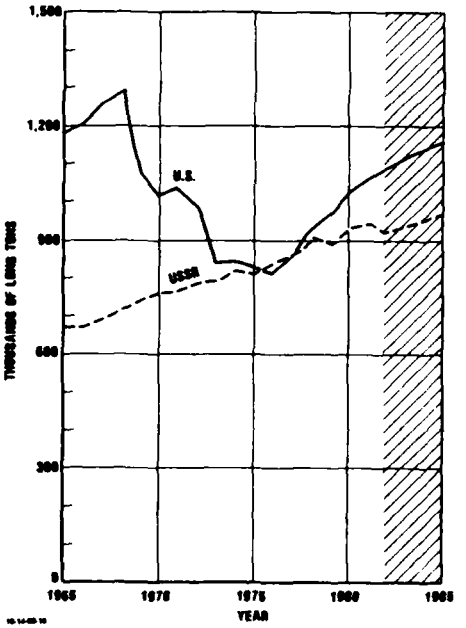


FIGURE 22

AVERAGE AGES

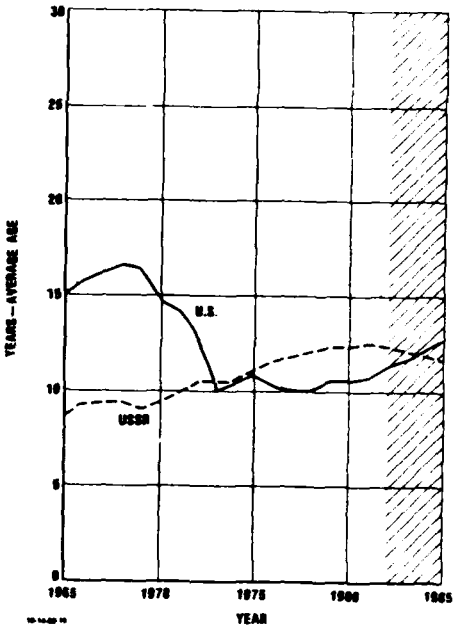


FIGURE 23

CRUISERS, DESTROYERS, AND FRIGATES

PROCUREMENT OUTLAYS

• Although the trends in U.S. spending rates for cruisers, destroyers, and frigates approximate the estimates for the U.S.S.R. spending, the Soviet Union produced more ships during the 1970s, but did not, on the average, produce as many tons as the United States.

• Of ships built in the 1970s, the average U.S. displacement was 8,000 tons; that of the Soviets 4,000 tons. The Soviet Union built 75 percent more ships for its lesser estimated expenditure per year.

CRUISERS, DESTROYERS, AND FRIGATES

PROCUREMENT OUTLAYS

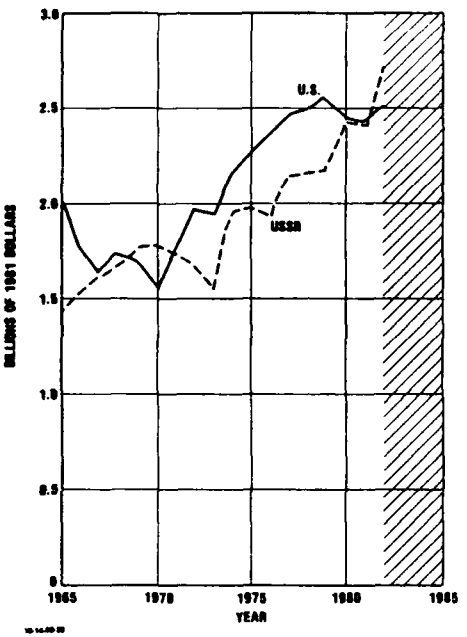


FIGURE 24

SHIP PRODUCTION

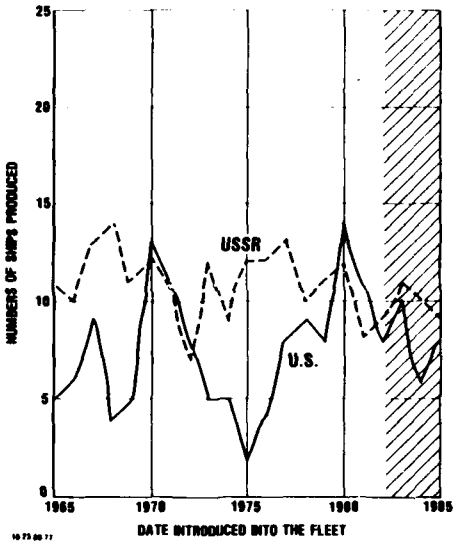


FIGURE 25

TONNAGE PRODUCTION

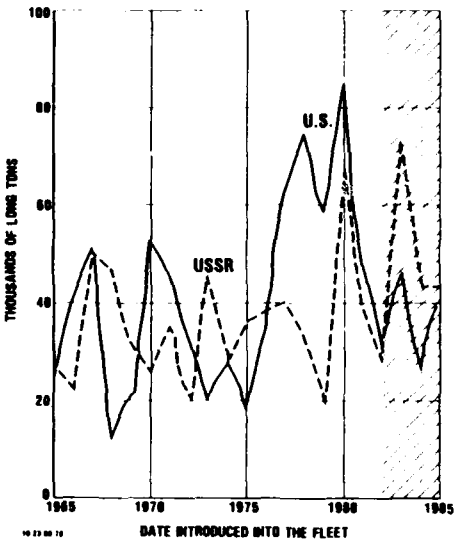


FIGURE 26

AMPHIBIOUS WARFARE SHIPS

This category points up the large difference in procurement goals.

- The force levels of Soviet amphibious vessels have been at least 1-1/2 times larger than the United States in 1965-1985.

- The tonnage of the U.S. amphibious vessels has been at least 3-1/2 times larger than the Soviets in 1965-1985, despite the large disadvantage in force levels.

- As a result of a more continuous procurement program, U.S.S.R. amphibious ships are now younger by about 5 years than those of the United States, and the gap is expected to widen to 10 years by 1985.

AMPHIBIOUS WARFARE SHIPS

FORCE LEVELS

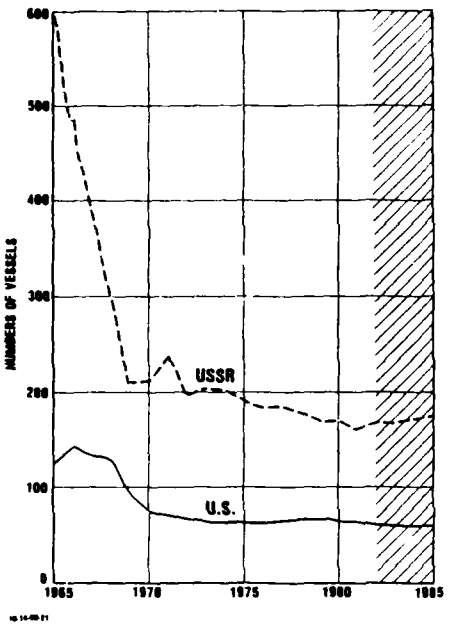


FIGURE 27

TONNAGES

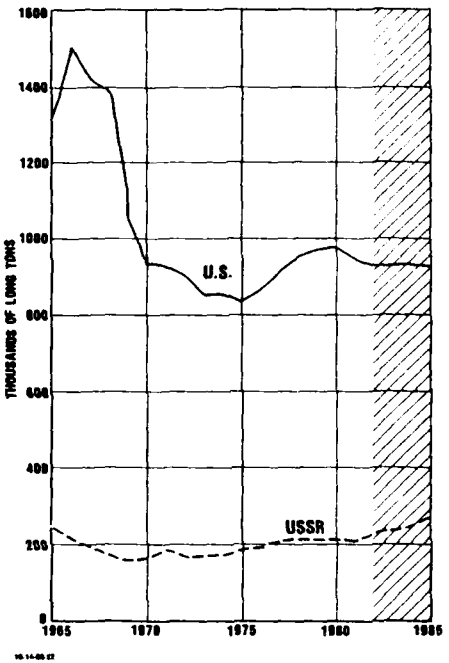


FIGURE 28

AVERAGE AGES

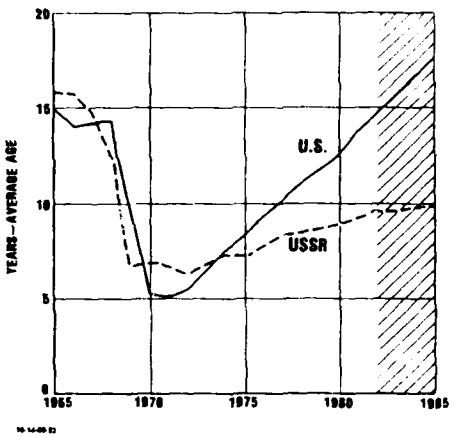


FIGURE 29

AMPHIBIOUS WARFARE SHIPS

PROCUREMENT OUTLAYS

- In the 1970s, the United States built 4 LHA's, at an estimated cost of $703 million (1981$) per ship, while the Soviet Union built 5 new classes, or 20 new ships. Soviet amphibious ships are much smaller. The most expensive U.S.S.R. ship is estimated to cost $176 million, and two types are estimated to cost less than $1 million each. Thus, although the outlay trend is downward, the United States spent several times as much as the Soviets are estimated to have done during 1970-79, although the Soviet Union acquired 5 times as many ships.

- In the early 1970s, the average U.S. new vessel displacement was 37,500 tons; the average Soviet vessel 1,700 tons. The Soviet Union built over 80 ships, the United States built 44. The United States is estimated to have spent up to 4 times for half the number of craft.

AMPHIBIOUS WARFARE SHIPS

PROCUREMENT OUTLAYS

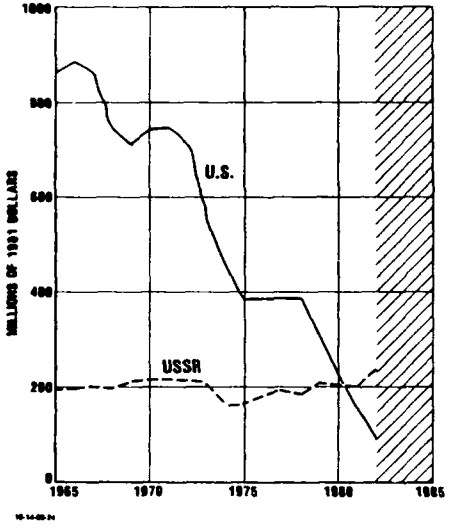


FIGURE 30

SHIP PRODUCTION

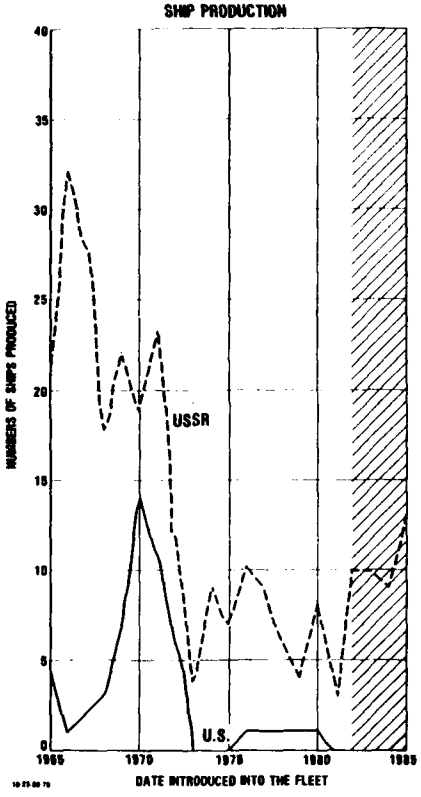


FIGURE 31

TONNAGE PRODUCTION

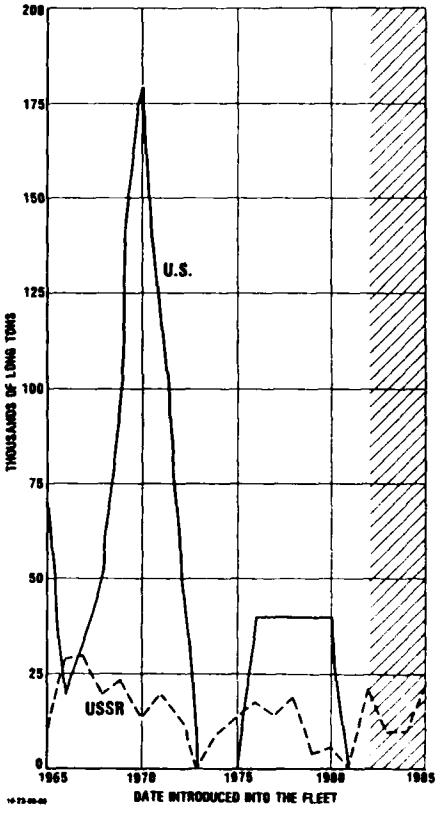


FIGURE 32

MINE WARFARE SHIPS

• The Soviet Union needs a strong mine-sweeping capability because it has limited access to open seas. At the same time, it recognizes a NATO coastline vulnerable to mine warfare. The United States shares NATO mine warfare responsibilities with its European allies. Both the United States and the Soviet Union have mine warfare capabilities in helicopters, which are not covered here.

• Thus there is a vast U.S.S.R. advantage in force levels of mine warfare ships. The difference between 3 (U.S.) and 323 (U.S.S.R.) vessels in 1975 is dramatic.

MINE WARFARE SHIPS

FORCE LEVELS

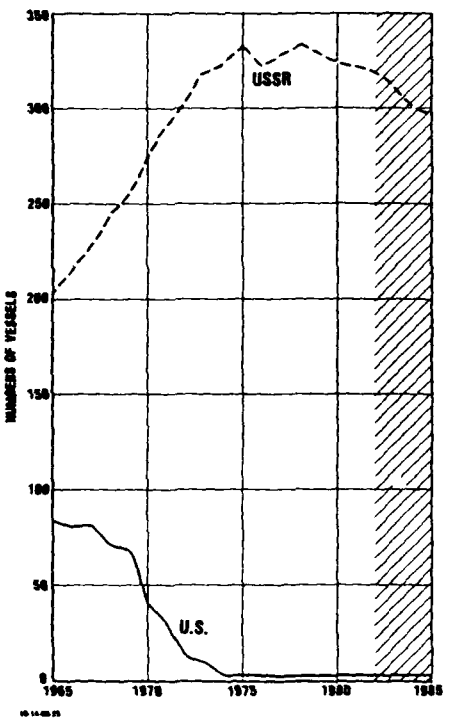


FIGURE 33

AVERAGE AGES

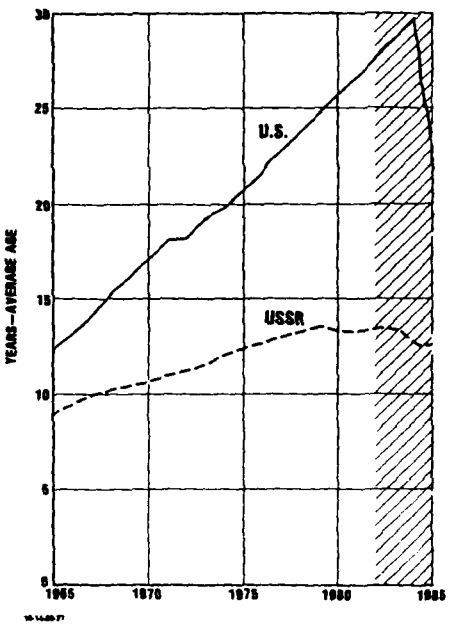


FIGURE 34

TONNAGES

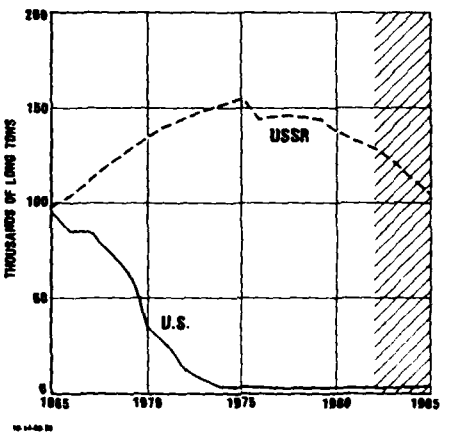


FIGURE 35

MINE WARFARE SHIPS

PROCUREMENT OUTLAYS

- The United States has built no new mine warfare ships since 1965. There are now only 3 MSO's in its active fleet.

- The United States plans a new MCM for 1985, estimated to cost $70 million.

- The Soviet Union is estimated to have spent from $250 to $400 million per year on mine warfare ships in 1965-80, and is projected to continue doing so.

- There were 4 new classes of U.S.S.R. mine warfare vessels in the late 1960's, 4 new classes in the 1970's, and 3 projected classes between now and 1988. Most of these ships are estimated to cost $60-80 million.

MINE WARFARE SHIPS

PROCUREMENT OUTLAYS

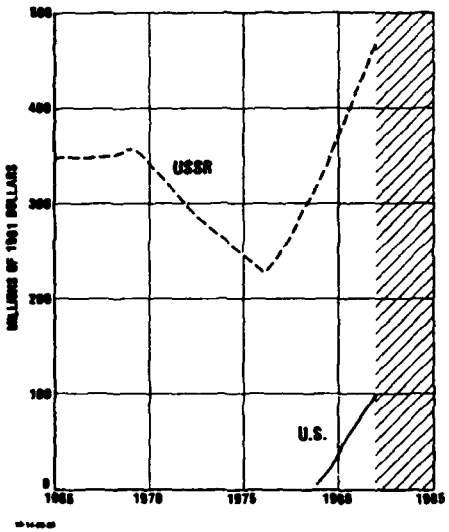


FIGURE 36

SHIP PRODUCTION

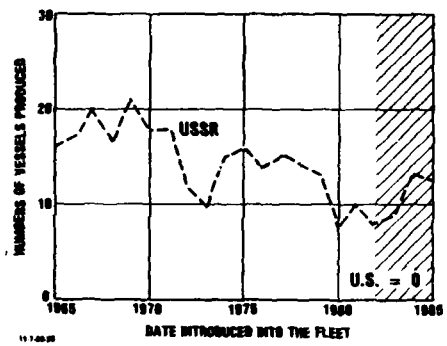


FIGURE 37

TONNAGE PRODUCTION

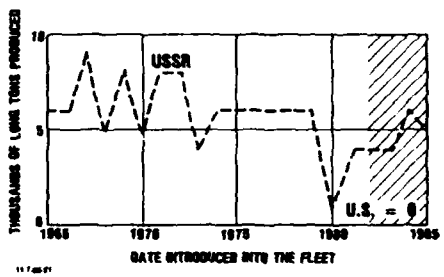


FIGURE 38

AUXILIARY FORCES

- The great variety of kinds and sizes of ships categorized as "auxiliary vessels" makes comparisons dealing with these ships inappropriate and without significance.

- The United States had a significant advantage over the Soviet Union in both force level and total tonnage of auxiliary vessels until the end of the 1970's, when the U.S.S.R. overtook the U.S. in force level although still trailing in tonnage.

- The U.S. is maintaining its auxiliary fleet at a nearly constant age by attrition and replacement, while the U.S.S.R. fleet is aging consistently.

AUXILIARY FORCES

FORCE LEVELS

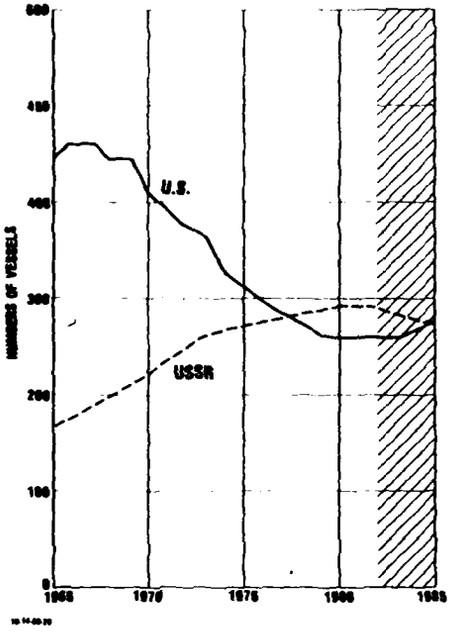


FIGURE 39

TONNAGES

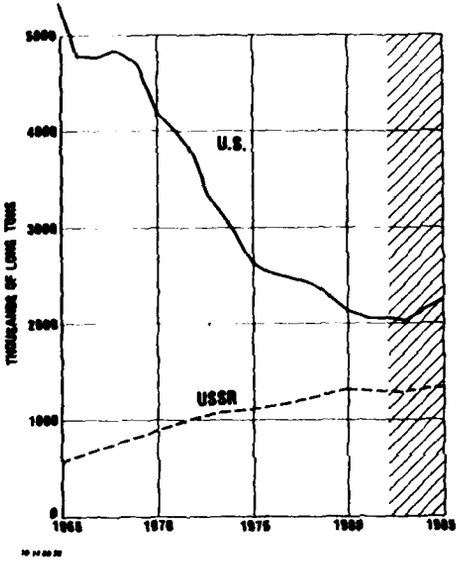


FIGURE 40

AVERAGE AGES

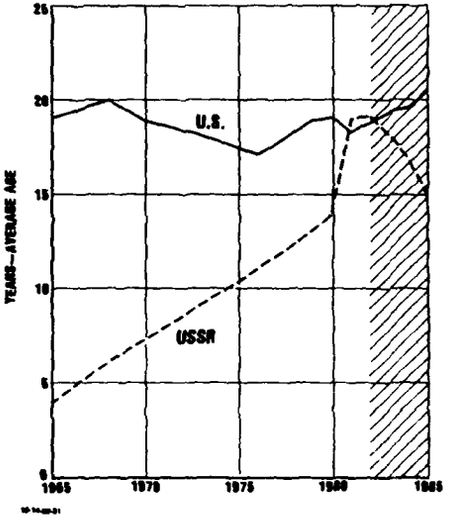


FIGURE 41

AUXILIARY FORCES

PROCUREMENT OUTLAYS

- Although the U.S.S.R. outlays for procurement of auxiliary vessels are estimated to have declined steadily since 1965, those of the United States have fluctuated drastically, down to a post-Vietnam low in 1974 and then back toward earlier levels by 1979.

- The production of U.S. auxiliary ships and tonnage evinces similar fluctuations, as do the U.S.S.R. plots, which show the Soviets producing a significantly greater number of auxiliaries than the United States although averaging about equal in tonnage.

AUXILIARY FORCES

PROCUREMENT OUTLAYS

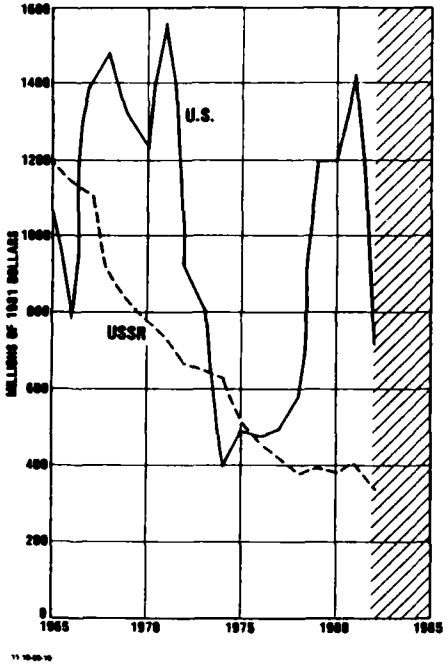


FIGURE 42

SHIP PRODUCTION

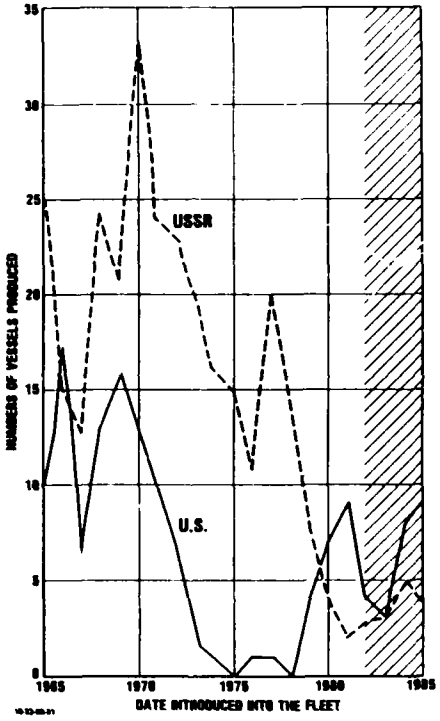


FIGURE 43

TONNAGE PRODUCTION

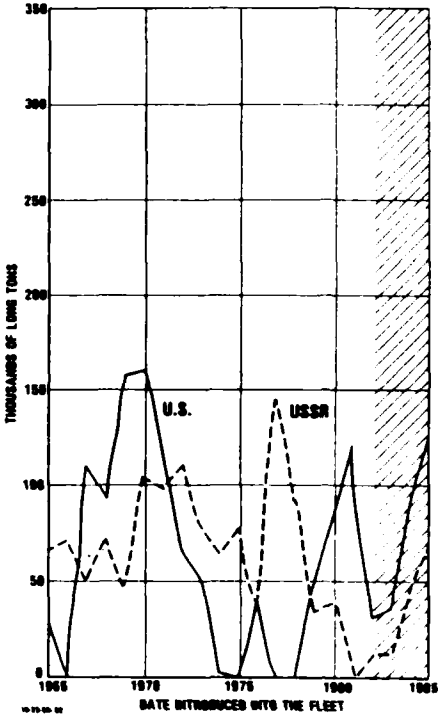


FIGURE 44

INVESTMENT AND AGE

- The average age graph shows that despite larger estimated procurement levels in numbers of ships, the Soviet Union has not drastically increased the overall newness of its fleet. Both U.S. and U.S.S.R. fleet ages declined early in the 1965-1985 period as a result of retiring WWII vessels.

- The comparison estimates of total procurement outlays, measured in constant 1981 dollars, reiterates that total spending rates were roughly comparable in 1975-1977, but that Soviet procurement is estimated to have advanced sharply and steadily since 1972 and is expected to maintain this increase while the U.S. rate has declined seriously.

GENERAL PURPOSE FLEETS

(LESS AUXILIARY VESSELS)

AVERAGE AGE

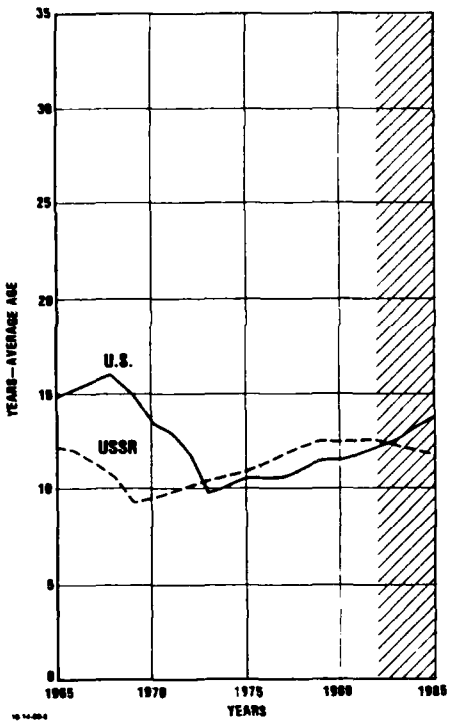


FIGURE 45

PROCUREMENT OUTLAYS

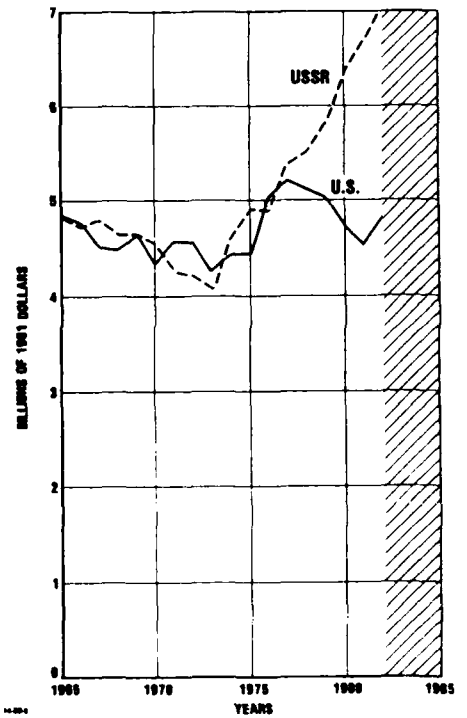


FIGURE 46

SHIPBUILDING

- The U.S.S.R. has been producing more than twice as many ships as the U.S. has done during the period being considered. By constructing larger ships the U.S. retained its advantage in new tonnage added to its fleet, particularly in the period 1967 to 1972. Since then production measured in displacement tonnage has been similar.

GENERAL PURPOSE FLEETS

(LESS AUXILIARY VESSELS)

SHIP PRODUCTION

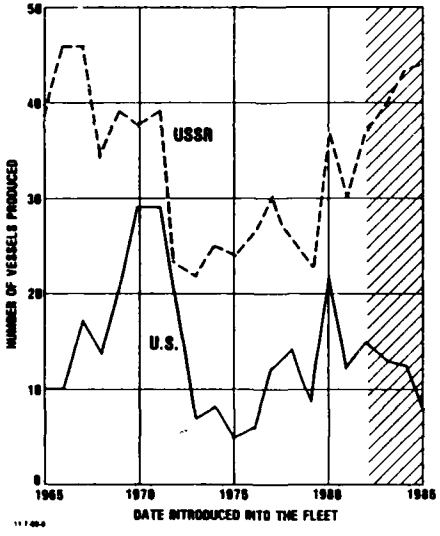


FIGURE 47

TONNAGE PRODUCTION

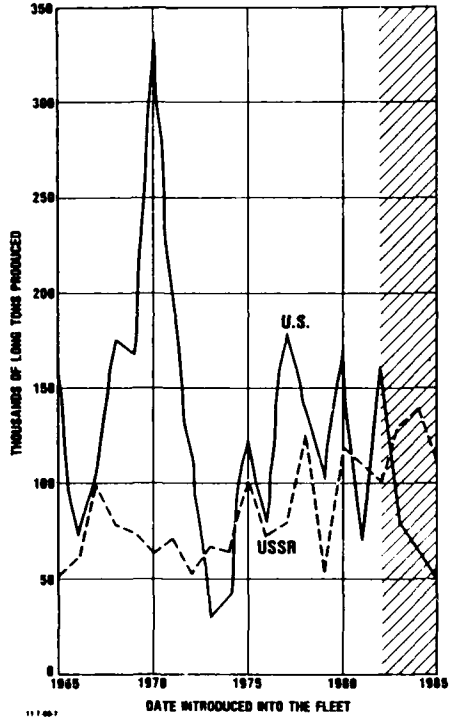


FIGURE 48

TOTAL PROCUREMENT OUTLAYS COMPARED

- Total U.S. and U.S.S.R. estimated procurement histories for general purpose shipe were roughly similar in 1965-1977.

- In that period, the major differences lay in greater U.S. aircraft carrier procurement, the larger amount of U.S. amphibious procurement, and the lack of U.S. mine warfare procurement. Until approximately 1977 the Soviet Union and the United States were estimated to have spent at similar rates for nuclear submarines. Since then the Soviets are estimated to be spending at a significantly higher rate for SSNs. Further, the Soviets are still estimated to spend an additional $0.5 billion/ year on diesel submarines.

- The sharp increase in estimated spending in the late 1970s and early 1980s, and the wide gap over U.S. spending, should lead to pronounced force level advantages to the U.S.S.R. by the mid- and late 1980s.

GENERAL PURPOSE FLEETS (LESS AUXILIARY VESSELS)

PROCUREMENT OUTLAYS

U.S.

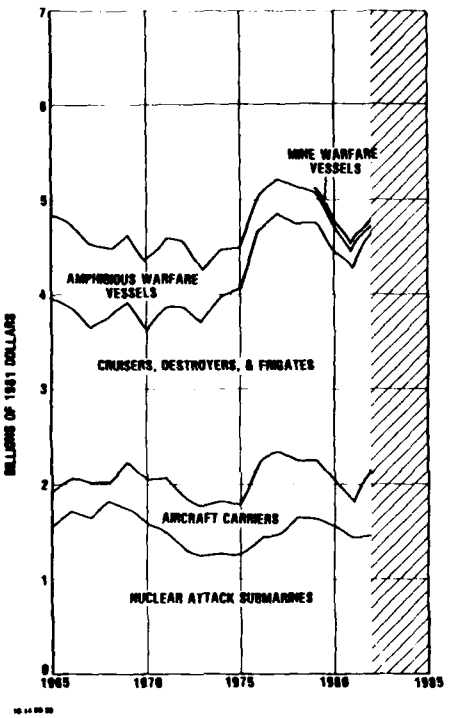


FIGURE 49

U.S.S.R.

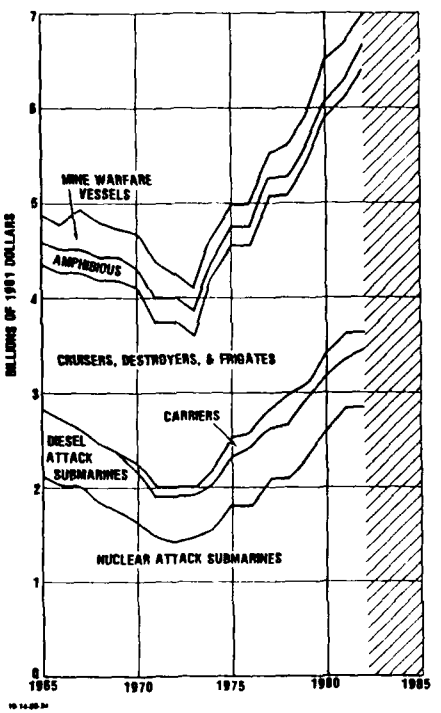


FIGURE 50

TOTALS

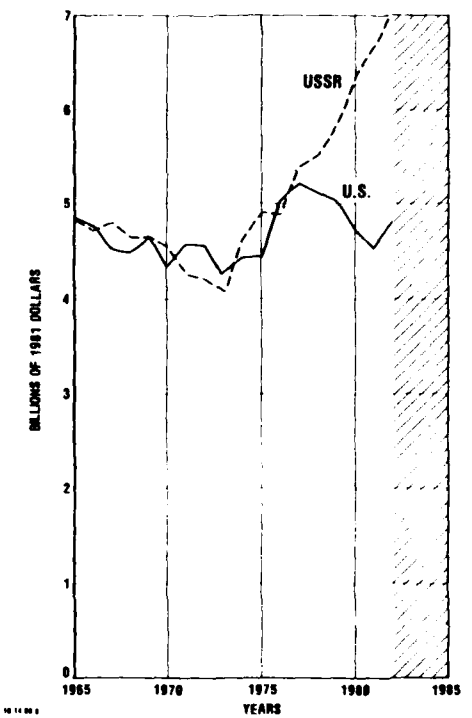


FIGURE 51

PRODUCTION COMPARISONS

- The Soviet Union has out-produced the United States in numbers of vessels for the active fleet throughout the entire period, although the U.S.S.R. estimated expenditures are not expected to lead to any advantage in tons of ships produced.

GENERAL PURPOSE FLEETS

SHIP PRODUCTION

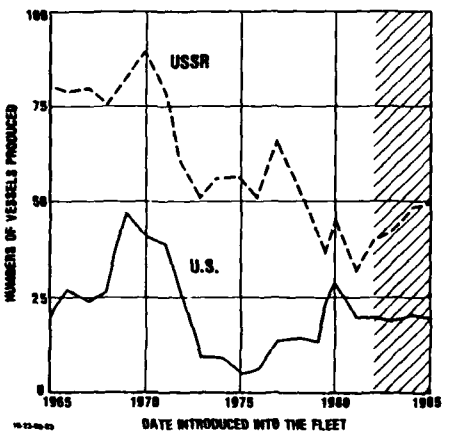


FIGURE 52

TONNAGE PRODUCTION

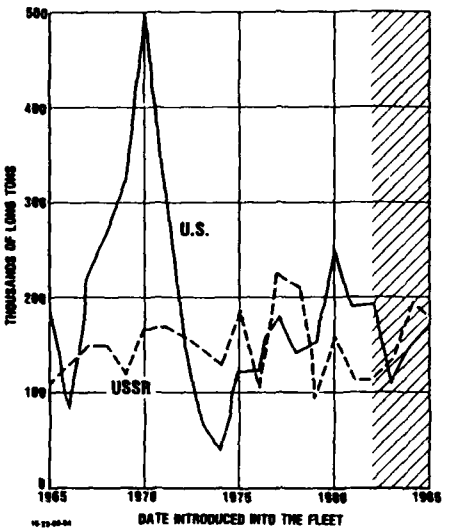


FIGURE 53

THE IDA PROCUREMENT OUTLAY MODEL -

COMPARISON WITH OTHER MODELS

- The figure at the left compares the IDA estimates of procurement outlay totals for the U.S.S.R. with those of the CIA. The solid line is the IDA estimate--the dashed line represents the CIA estimate.

- The graph at the right compares the IDA estimate of the U.S. outlay with the FYDP totals for general purpose ship procurement, and with the CIA estimate.

PROCUREMENT OUTLAYS

COMPARISON WITH OTHER MODELS

IDA-CIA

U.S.S.R.

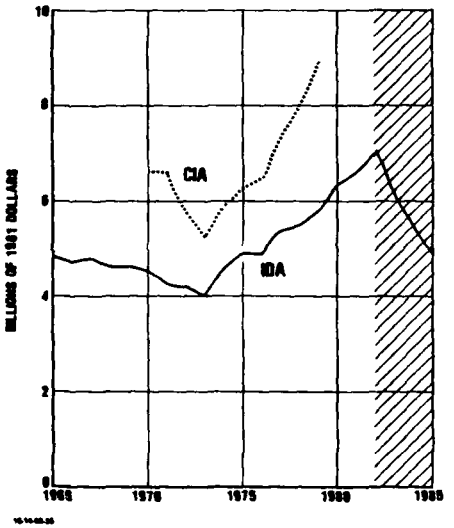


FIGURE 54

IDA-FYDP-CIA

U.S.

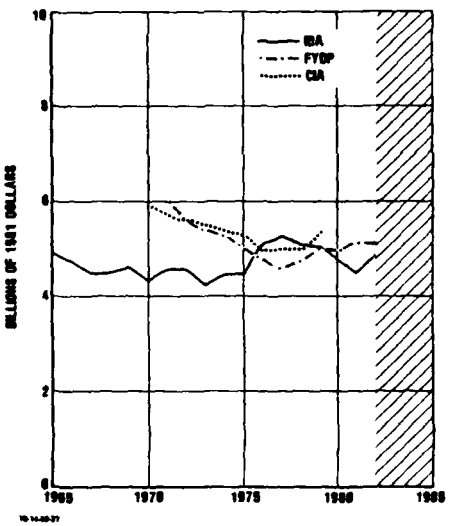


FIGURE 55

R&D ESTIMATING

A RESEARCH AND DEVELOPMENT COST ESTIMATING ATTEMPT AND COMPARISON

- IDA research to date has developed no simple CER for naval R&D based on ship productions. The major part of U.S. ship-related R&D is directed toward ship systems or categories rather than toward specific ship classes (Figure 56). U.S. naval ship R&D appears to be almost independent of ship procurement. Rather, it seems to show a gradually increasing level of effort (Figure 57).

- To provide a rough estimate, trend lines were computed for U.S. SCN and ship-related RDT&E expenditures (Figure 58) from the FYDP and factors developed for each year based on the ratio of R&D to SCN. These factors were then used to estimate U.S. and U.S.S.R general purpose ship-related R&D as a function of ship procurement outlay estimates (Figure 59). This methodology has doubtful validity in estimating the R&D for specific ship programs, but it may be useful as a first approximation in comparing possible U.S. and U.S.S.R. trends for general purpose ship-related R&D.

U.S. SHIP-RELATED R&D APPROPRIATIONS

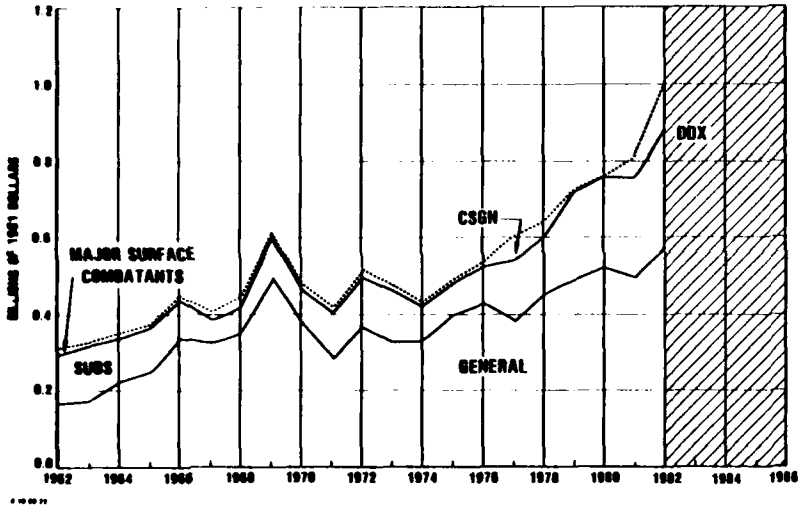


FIGURE 56

U.S. R&D APPROPRIATIONS

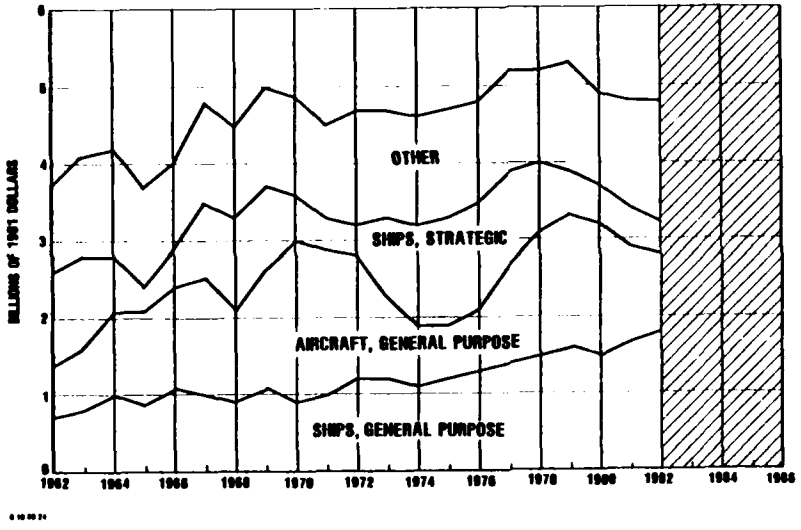


FIGURE 57

U.S. SHIP-RELATED R&D AND SCN OUTLAYS

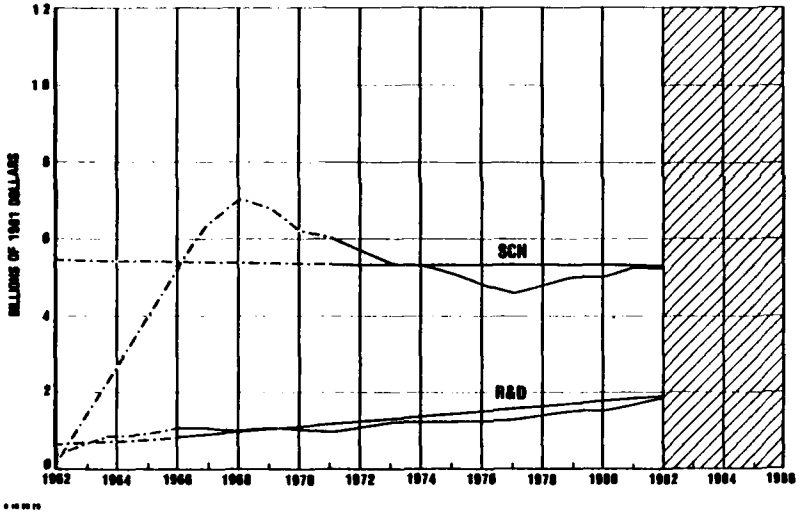


FIGURE 58

SHIP-RELATED R&D OUTLAYS - U.S. AND U.S.S.R.

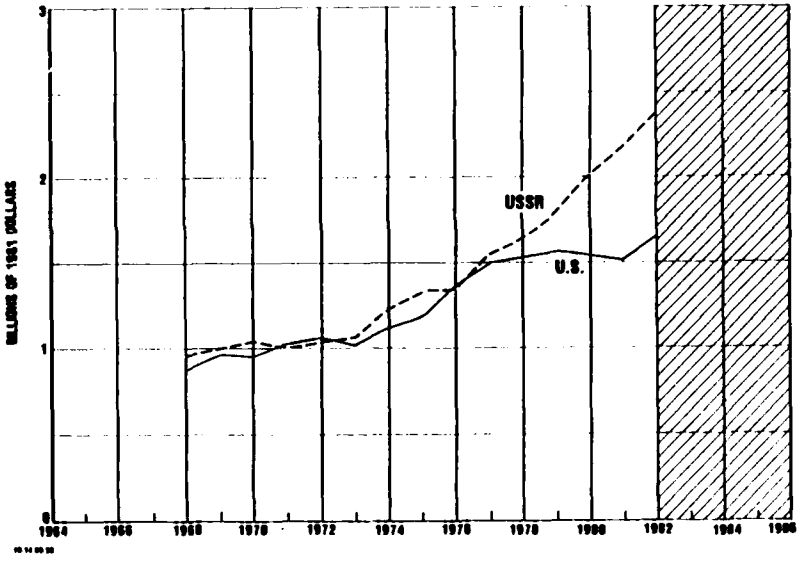


FIGURE 59

REFERENCES

1. "Composition of the Active Fleet, U.S. Navy, 1961-1985 (U)," IDA Paper P-1520, J. T. McIntyre, J. H. Henry, December 1980 (UNCLASSIFIED).

2. "Simple Procurement Cost Estimating Relationships for the U.S. Navy General Purpose Ships (U)," IDA Paper P-1530, P. Cutchis, J. H. Henry, March 1981 (UNCLASSIFIED).

APPENDIX A

U.S. AND U.S.S.R. FORCE LEVELS, TONNAGE, AND PROCUREMENT COST

TABLE A-1. FORCE LEVELS

U. S. FLEET

	1965	1966	1967	1968	1969	1970	1971	1972	1973
Diesel Attack Submarines	73	73	73	68	61	53	44	29	15
Nuclear Attack Submarines	22	25	31	36	43	46	53	57	59
Aircraft Carriers	25	23	23	23	20	19	17	16	14
Cruisers/Destroyers/ Frigates	272	274	284	276	240	222	224	204	162
Amphibious Warfare Vessels	127	144	135	129	91	74	72	69	64
Mine Warfare Vessels	83	81	81	71	70	41	30	13	9
Total Fleet	602	620	627	603	525	455	440	388	323
Auxiliary Warfare Vessels	446	462	460	447	446	413	390	374	364

SOVIET FLEET

Diesel Attack Submarines	287	279	271	262	249	244	235	216	200
Nuclear Attack Submarines	34	43	47	51	55	59	62	65	70
Aircraft Carriers	-	-	-	-	-	-	-	-	-
Cruisers/Destroyers/ Frigates	202	202	206	209	220	224	225	228	232
Amphibious Warfare Vessels	592	487	393	302	211	214	237	199	205
Mine Warfare Vessels	205	216	229	245	254	273	291	301	320
Total Fleet	1320	1227	1146	1069	989	1014	1050	1009	1027
Auxiliary Warfare Vessels*	168	181	193	201	213	225	238	254	264

TABLE A-1. FORCE LEVELS

U. S. FLEET

1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
13	11	11	10	8	7	5	5	4	3	1	1
62	64	64	67	71	72	77	80	85	89	94	95
14	15	13	13	13	13	12	11	13	13	13	13
162	161	154	159	164	171	184	196	207	216	221	227
64	62	63	64	65	65	63	61	60	60	60	60
3	3	3	3	3	3	3	3	3	3	3	4
318	316	308	316	324	331	344	356	372	384	392	400
331	312	299	283	275	262	260	258	259	259	267	276

SOVIET FLEET

183	185	179	176	177	179	171	157	150	134	126	119
73	79	80	81	84	91	98	105	111	118	123	130
-	-	1	1	2	2	2	3	3	3	4	4
238	240	246	251	260	260	264	258	253	246	242	240
203	191	186	185	180	171	172	164	169	169	173	178
323	333	323	329	333	330	325	322	320	312	301	299
020	1028	1015	1023	1036	1033	1032	1009	1006	982	969	970
271	268	273	276	280	288	290	287	287	281	279	275

TABLE A-2. TONNAGE (Thousands of Tons)

U. S. GENERAL PURPOSE SHIPS

	1965	1966	1967	1968	1969	1970	1971	1972	1973
Diesel Attack Submarines	179	179	179	167	151	131	110	74	40
Nuclear Attack Submarines	86	100	127	151	182	196	228	246	255
Aircraft Carriers	1398	1295	1295	1337	1222	1209	1125	1087	1007
Cruisers/Destroyers/ Frigates	1188	1213	1263	1293	1084	1014	1032	985	840
Amphibious Warfare Vessels	1828	1503	1429	1396	1062	939	936	905	856
Mine Warfare Vessels	95	85	85	73	64	35	26	11	8
Total Tons	4274	4375	4378	4417	3765	3524	3457	3308	3006
Auxiliary Warfare Vessels	5364	4787	4803	4864	4753	4250	4004	3821	3314

SOVIET GENERAL PURPOSE SHIPS

Diesel Attack Submarines	393	395	397	400	390	392	384	363	350
Nuclear Attack Submarines	178	229	251	271	289	310	323	336	360
Aircraft Carriers	-	-	-	-	-	-	-	-	-
Cruisers/Destroyers/ Frigates	679	676	683	706	743	763	766	785	796
Amphibious Warfare Vessels	246	216	194	174	157	163	188	169	173
Mine Warfare Vessels	99	103	111	120	128	134	140	144	148
Total Tons	1595	1619	1636	1671	1707	1762	1801	1797	1827
Auxiliary Warfare Vessels	600	668	738	775	816	885	939	1003	1052

TABLE A-2. TONNAGE (Thousands of Tons)

U. S. GENERAL PURPOSE SHIPS

1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
35	30	30	28	23	20	14	14	11	8	3	3
271	280	282	303	331	338	375	396	431	458	493	500
1007	1101	1018	1048	1048	1048	968	904	1079	1079	1079	1079
841	829	815	866	924	967	1026	1060	1092	1121	1140	1162
856	837	876	915	955	975	978	951	932	932	932	932
3	3	3	3	3	3	3	3	3	3	3	4
3013	3080	3024	3163	3284	3351	3364	3328	3548	3601	3650	3680
2999	2625	2552	2494	2415	2329	2173	2096	2088	2055	2143	2269

SOVIET GENERAL PURPOSE SHIPS

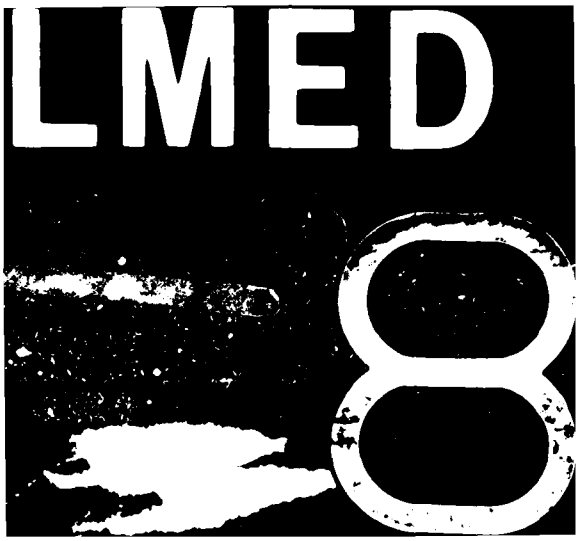
333	343	343	341	348	358	358	347	348	328	322	316
373	402	407	413	426	459	493	527	556	590	616	650
-	-	36	36	72	72	72	108	108	108	144	144
820	814	839	870	904	897	933	942	925	947	960	968
174	182	192	205	216	216	217	211	234	239	249	277
151	155	143	155	145	144	137	132	129	122	111	105
1851	1896	1960	2020	2111	2146	2210	2267	2300	2334	2402	2460
1095	1120	1144	1182	1204	1279	1318	1314	1324	1306	1317	1360

TABLE A-3. PROCUREMENT COSTS FOR GENERAL PURPOSE SHIPS (Outlays in 1981$, Millions)

	1965	1966	1967	1968	1969	1970	1971	1972	1973
U.S.					U.S.				
Nuclear Attack Submarines	1564	1724	1645	1800	1739	1578	1491	1304	1235
Diesel Attack Submarines	0	0	0	0	0	0	0	0	0
	1564	1724	1645	1800	1739	1578	1491	1304	1235
Aircraft Carriers	365	365	365	206	477	477	588	588	542
	1929	2089	2010	2006	2216	2055	2079	1892	1777
Cruisers, Destroyers, Frigates	2028	1784	1639	1740	1693	1567	1766	1973	1921
	3957	3873	3649	3746	3909	3622	3845	3865	3698
Amphibious	866	887	865	752	715	742	744	714	553
	4823	4760	4514	4498	4624	4364	4589	4579	4251
Mine Warfare	0	0	0	0	0	0	0	0	0
	4823	4760	4514	4498	4624	4364	4589	4579	4251
Auxiliary	1060	795	1380	1475	1325	1240	1550	925	820
U.S.S.R.					U.S.S.R.				
Nuclear Attack Submarines	2066	2011	2030	1837	1715	1619	1456	1431	1479
Diesel Attack Submarines	749	649	606	582	578	521	427	441	415
	2815	2660	2636	2419	2293	2140	1883	1872	1894
Aircraft Carriers	0	0	0	0	0	71	71	143	143
	2815	2660	2636	2419	2293	2211	1954	2015	2037
Cruisers, Destroyers, Frigates	1442	1528	1606	1682	1760	1791	1749	1675	1547
	4257	4188	4242	4101	4053	4002	3703	3690	3584
Amphibious	198	199	204	199	216	219	226	217	207
	4455	4387	4446	4300	4269	4221	3929	3907	3791
Mine Warfare	348	349	352	352	359	345	323	299	279
	4803	4736	4798	4652	4628	4566	4252	4206	4070
Auxiliary	1212	1143	1124	899	833	776	735	672	656

TABLE A-3. PROCUREMENT COSTS FOR GENERAL PURPOSE SHIPS (Outlays in 1981$, Millions)

1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
					U.S.						
1259	1251	1424	1472	1644	1618	1567	1415	1415	1112	961	708
0 / 1259	0 / 1251	0 / 1424	0 / 1472	0 / 1644	0 / 1618	0 / 1567	0 / 1415	0 / 1415	0 / 1112	0 / 961	0 / 708
542 / 1801	542 / 1793	870 / 2294	870 / 2342	599 / 2243	599 / 2217	450 / 2017	450 / 1805	721 / 2136	721 / 1833	721 / 1682	393 / 1101
2146 / 3947	2269 / 4062	2376 / 4670	2470 / 4812	2500 / 4743	2547 / 4764	2460 / 4477	2435 / 4300	2508 / 4644	2056 / 3889	1773 / 3455	1567 / 2668
468 / 4415	390 / 4452	390 / 5060	390 / 5202	390 / 5133	312 / 5076	234 / 4711	162 / 4462	104 / 4748	27 / 3916	27 / 3482	27 / 2695
0 / 4415	0 / 4452	0 / 5060	0 / 5202	0 / 5133	8 / 5084	39 / 4750	70 / 4532	101 / 4849	101 / 4017	101 / 3583	101 / 2796
390	490	480	495	580	1190	1195	1425	725			
					U.S.S.R.						
1618	1814	1841	2050	2064	2333	2585	2778	2765	2478	2164	1898
469 / 2087	494 / 2308	519 / 2360	551 / 2601	524 / 2588	536 / 2869	577 / 3162	570 / 3348	592 / 3357	513 / 2991	464 / 2628	380 / 2278
143 / 2230	214 / 2522	214 / 2574	214 / 2815	287 / 2875	214 / 3083	214 / 3376	263 / 3611	263 / 3620	263 / 3254	192 / 2820	192 / 2470
1940 / 4170	1969 / 4491	1906 / 4480	2137 / 4952	2168 / 5043	2179 / 5262	2413 / 5789	2400 / 6011	2720 / 6340	2197 / 5451	1973 / 4793	1846 / 4316
166 / 4336	162 / 4653	186 / 4666	198 / 5150	186 / 5228	210 / 5472	202 / 5991	204 / 6215	238 / 6578	230 / 5681	229 / 5022	191 / 4507
264 / 4600	251 / 4904	230 / 4896	249 / 5398	287 / 5515	329 / 5801	372 / 6363	421 / 6636	471 / 7049	445 / 6126	424 / 5446	408 / 4915
625	512	454	415	379	390	383	401	338	275	263	236


LMED
8